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The Age of the Machine: Technology's Role in German Intellectuals' Definitions of Modernity, 1900-1945

by

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For my brother Ian, whose dedication to his craft, has inspired me to dedication in mine.

Abstract

Examinations of early 20th century German intellectuals often incorporate normative definitions of modernity in an attempt to explain the rise of National Socialism. However, such an approach takes for granted the multiple, simultaneous definitions of modernity created by intellectuals of this era, and thus downplays them to a significant extent. A re-reading of intellectuals such as Ernst Jünger, Oswald Spengler, Martin Heidegger, and academically trained German Engineers makes clear the diversity of thought regarding both the centrality of technology to the modern world and the definition of the modern world itself. This diversity demonstrates that these thinkers cannot necessarily be judged by normative definitions of modernity.

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According to Detlev Peukert, most traditional definitions of modernity are normative definitions, which attempt to provide a "systematic account of the evolution of all industrialized societies."[1] A key component of these definitions is their incorporation of an idealized notion of "western social evolution." German social development, especially with regards to the origins of National Socialism, is often characterized in terms of its deviation from these idealized notions.[2] For instance, historians such as Ralf Dahrendorf and Hans-Ulrich Wehler contend that Germany rejected Enlightenment reason and embraced a political tradition of authoritarian illiberalism far removed from the parliamentary democracy of other highly industrialized nations such as America, Britain, and France, as part of what is considered German anti-modernism.[3] Consequently, studies examining any aspect of late nineteenth and early twentieth century German history, whether social, cultural, economic, or political, are all in some way forced to address the issue of modernity and whether or not definitions of modernity should be used as a framework for judging history.

Peukert has argued the most emphatically for using the Weimar Republic as the marker of Classical Modernity from which to study "the political and social-historical as well as cultural problems of the early twentieth century."[4] Peukert's definition of modernity differs substantially from traditional normative definitions of modernity: he favors a non-normative definition, which is empirical and descriptive as opposed to

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[1] Detlev Peukert, The Weimar Republic, translated by Richard Deveson (Middlesex, England: The Penguin Press, 1991), p. 81.
[2] Ibid.
[3] Eley Geoff. German History and the Contradictions of Modernity" in Geoff Eley (ed.) Society, Culture, and the State in Modern Germany: 1870-1930 (Ann Arbor, Michigan: University of Michigan Press, 1996), pp. 80-82.
[4] Ibid., p. 77.

explanatory.[5] For Peukert, modernity can be defined as the industrialized world that began at the turn of the nineteenth century. In terms of economics, modernity is characterized by rationalized production and complex administrative networks, which co-exist with a small agricultural sector that is responsible for food production. In social terms, modernity can be characterized by the division of labor and an urbanized environment, in which there is a great demand for skills, training, and education. Intellectually, modernity is the "triumph of western rationality." This rationality includes social planning and scientific and technological expansion.[6]

Peukert's definition is useful for this discussion because it outlines the major areas that early 20th century German thinkers and critics addressed when discussing the modern world. A passage from American reformer Frederic Howe's Socialized Germany, in which the author examines the progress of solutions to social question in an autocratic government, shows just how deeply engaged Wilhelmine Germany was with these questions of modernity:

> Administrative and industrial efficiency are a scientific study in which hundreds of thousands of the best minds of the state are engaged....there is efficiency in transportation, scientific thought to every process and every social and industrial problem; there is the greatest concern for human life, for health and well-being, for education and training of workers, artists, commercial men and scientists, and the co-ordination of the individual into a machine of national rather than purely personal dimensions.[7]

German thinkers were obsessed with the ways that rationality and technology could be applied to the economy, social questions, and German culture, and how these applications were affecting Germany. Central to these issues of modernity was the question of technology and its role in the modern world. Technology figured prominently in the

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[5] Peukert, Weimar Republic, pp. 81-82.
[6] Peukert, Weimar Republic, pp. 81-82.
[7] Kevin Repp, Reformers, Critics and the Paths of German Modernity, (Cambridge, Massachusetts: Harvard University Press, 200), p. 1.

writings of key early twentieth century German thinkers, such as Ernst Jünger, Oswald Spengler and Martin Heidegger, as well as academically trained engineers. Spengler believed that technology was fostering the decline of western culture through its affect on economics and culture. Jünger linked technology and the Great War together into an experience that forged the modern man and the modern world on the battlefield. Heidegger saw technology as vital to the concept of modernity itself, and argued that technology and the modernist worldview affected man's very ability "to be". Engineers were also interested in technology's role in the modern world. The publications of various engineering societies such as the Verband Deutscher Diplom-Ingenieure (VDDI), the society of diploma (university educated) engineers, are full of articles in which engineers discussed the effects of technology on all aspects of German life.

When examining Germany's entry into the "modern world," the use of normative definitions of modernity to label Germany's development as deviant when compared to normal "western" development, has led to the hypothesis that National Socialism can be explained as the result of a special path or "*Sonderweg.*"[8] Pro-Sonderweg historians argue that there was a divergence of German thought from the rest of Europe with regard to certain cultural and political ideals such as Enlightenment rationality, liberalism, and parliamentarianism. In place of these ideals, according to this perspective, German thinkers substituted a "*völkisch*" ideology which embraced irrationalism, principles of authoritarian leadership, and ethnic-racial definitions of Germanness. Both Fritz Stern and George Mosse examine the German conservative revolution and "Germanic" or "*völkisch*" ideology. Stern and Mosse argue that an understanding of the ideals of "*völkisch*" ideology and the conservative revolution are key, in Mosse's words, "toward

[8] Peukert, Weimar Republic, p. 81.

an explanation of Germany's unique development."[9] Paul de Lagarde, Julius Langbehn, and Arthur Moeller van der Bruck are the three "*völkisch*" ideologists that Stern and Mosse study. The use of the term "*völkisch*" stems from the belief among these ideologists that there was a special German *Volk*. In this sense the term "*Volk*" means much more than merely people. Rather, the "*Volk*" were a group of people bound together by a common essence, which was determined through an essential connection between man and his natural surroundings. Largarde, Langbehn, and Van der Bruck reacted against what they saw as a decline in German culture and the unity of the German "*Volk*" and their replacement with modernity and liberalism. The reasons for cultural decline varied for each critic; however, all three hated liberalism and conflated it with modernity, especially Van der Bruck, who felt that there "was no evil for which [liberalism] was not responsible."[10] According to Stern, "They attacked liberalism because it seemed to them the principal premise of modern society; everything they dreaded seemed to spring from it: the bourgeoisie life, Manchesterism, materialism, parliament and the parties, and lack of political leadership."[11] Sick of a culture they felt was in decline as a result of the rise of modernity, they rejected modernity and sought to find solutions which would help the German people overcome the evils of the liberal world.

Lagarde, Langbehn, and Van der Bruck believed that the solutions to this problem lay in the renewal of the German spirit and strengthened unity of the *Volk*. Lagarde felt that this could be accomplished through a new German religion which addressed the

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[9] George Mosse, The Crisis of Modern German Ideology (New York: Howard Fertig Inc, 1964), p. 1.
[10] Fritz Stern, The Politics of Cultural Despair (California: The Regents of the University of California, 1968), p. 247.
[11] Ibid., 2.

unique German characteristics of "independence of intellect, a love of loneliness, and a peculiar self-hood of the individual."[12] Langbehn believed that a unification of art and politics would create a new artistic age which would lead to spiritual renewal.[13] Van der Bruck proposed that a new German socialism would use class differences to unite the *Volk*.[14] Despite the different solutions each thinker proposed, all three believed that a strong leader was essential in order to achieve the final goal of German spiritual renewal.

Stern argues that the writings and ideas of Lagarde, Langbehn, and Van der Bruck were a specific reaction to modernity indicative of the feelings of the majority of Germans, and furthermore, that this reaction was irrationalist, because, as Stern states, these men "...condemned or prophesized, rather than exposited or argued, and all their writings showed that they despised the discourse of intellectuals, depreciated reason, and exalted intuition."[15] Their hatred of liberalism and parliamentarianism, political concepts born of the Enlightenment, only furthers this characterization. It was this unique reaction to modernity which was responsible for the German rejection of modern society and the resentment that many Germans felt towards western ideas. This dissatisfaction with modernity, as embodied in rational, liberal and capitalistic society, in Stern's words, "constitutes the main link between all that is venerable and great in the German past and the triumph of National Socialism."[16]

According to Mosse, "*völkisch* ideology," which stemmed directly from the German Romantic movement of the 19th century, was systematized primarily in the writings of Lagarde, Langbehn, and Van der Bruck. *Völkisch* ideology rejected reason

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[12] Ibid., p. 77.
[13] Ibid., p. 171.
[14] Ibid., p. 319.
[15] Ibid., pp. 4 and 15.
[16] Ibid., p. 15.

and rationality and was opposed to progress and modernization. It gave primacy to the natural and the rural as opposed to the industrialized urban city.[17] Also central to "*völkisch*" thought were racism and anti-semitism. Thus, inevitably, the Jew became a personification of liberalism and modernity, the two things most despised by *völkisch* thinkers.

Mosse argues that the depth of feeling showed by *völkisch* thought was not equaled elsewhere in Europe and that it was this particular view of modern society and modern man that differentiated Germany from its neighbors.[18] According to Mosse, *völkisch* thought had permeated the German nation, specifically the German Right to such an extent that the entire nation was of the mindset that the only solution to Germany's problems lay with *völkisch* principles.[19] Consequently, the National Socialist party with its ties to *völkisch* thought became an acceptable choice in January 1933.

Germanic or *völkisch* ideology and its rejection of modernity was the basis of National Socialist ideology according to Stern and Mosse. The National Socialist triumph in Germany was a direct result of the attitudes of "cultural despair" which had begun in the later half of the 19th century in Germany and had been so eloquently seized upon and critiqued by men such as Lagarde, Langbehn, and Moeller van der Bruck. Both ideologies saw liberalism as the arch-enemy.[20] Both ideologies desired a strong "*völkisch*" Germany that was led by a strong *Führer* who was capable of feeling the will of the German people. Additionally, Stern indicates that there were many prominent Nazi

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[17] Mosse, pp. 1-19.
[18] Ibid., p. 1.
[19] Ibid., p 8.
[20] Ibid., p. 2.

thinkers such as Alfred Rosenberg and Ernst Kreik who considered themselves intimately tied to Germanic ideologists.[21]

In his study of 20th Century intellectuals and engineers, Jeffrey Herf contends that it was the unique German response to modernity, rather than the rejection of modernity, which allowed the National Socialists to rise to power in Germany. Herf attempts to explore how German thinkers bridged the gap between "*völkisch*" irrationalism and technological modernity, which he refers to as a burdensome ideological contradiction. Herf feels that this paradox exists because these intellectuals were both irrationalists, which Herf defines as the reification of certain absolutes such as blood, race, and soul at the expense of Enlightenment reason, and technological modernizers.[22] The key thinkers Herf examines are Oswald Spengler, whose primary object was a critique of German culture, author Ernst Jünger, academics Carl Schmitt and Werner Sombart, sociologist Hans Freyer, philosopher Martin Heidegger and academically-trained engineers.

Herf argues not that the Nazis represented an excess of reason or that they rejected modernity as Stern and Mosse claim, but rather that they only partially embraced Enlightenment ideals, such as a rational scientific approach to religious, social, political, and economic issues as well as the belief of the state as a rational instrument of progress, and incorporated them into the irrational core of their ideology.[23] He also argues that contrary to previous assumptions, the Nazis and the key Weimar thinkers were not opposed to technology, but rather that they believed Germany could be both "*völkisch*" and technologically advanced. According to Herf, these thinkers embraced the German romantic tradition, "which encouraged a pre-occupation with a world of powerful hidden

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[21] Ibid., p. 358.
[22] Jeffrey Herf, Reactionary Modernism (Cambridge: Cambridge Univeristy Press, 1984), pp. 12-13.
[23] Ibid., p. 10.

forces beyond or beneath the world of appearances," and emphasized the concept of the self.[24] Thus, Herf argues that these men discussed technology in terms of "powerful forces," such as will, race, blood, community, and the self, which were beyond rational justification, and consequently blended modern technology with German culture and German nationalism. Herf argues that this amalgam of technology and irrationalism, which he terms "Reactionary Modernism," was a cultural response to the arrival of modernity in Germany. According to Herf the "Reactionary Modernist" tradition "consisted of a coherent and meaningful set of metaphors, familiar words, and emotionally laden expressions that had the effect of converting technology from a component of alien Western *Zivilisation* into an organic part of German *Kultur*."[25]

With regards to German engineers, Herf argues that they were primarily engaged in "cultural politics." Although Herf admits that these "cultural politics" in some ways served to enhance the status of engineers in the eyes of other professionals, they were primarily intended to situate engineers as cultural figures.[26] According to Herf, "the engineers sought to convince themselves and their skeptical cohorts in law, medicine, the civil service, and the traditional humanistic disciplines that they-- the engineers-- and the results of their labours -- the artifacts of the second industrial revolution-- belonged to the *Kulturnation*."[27] Thus, engineers were excited by Nazi propaganda that represented the Nazis as "dedicated to emancipating technology from its misuse by market interests and then to placing it in the service of the state."[28] Consequently, engineers enthusiastically

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[24] Ibid., pp. 15-16.
[25] Ibid., p. 1.
[26] Ibid., p. 152.
[27] Ibid.
[28] Ibid., p. 221.

accepted the National Socialists since they promised to further the engineer's "cultural politics."

While Herf only briefly examines engineers and their position in terms of "reactionary modernism," Kees Gispen examines the struggle of "engineers" to define themselves as an important modern profession, as well as addressing the issues faced by engineers with regards to inventing and patents. Using as his primary sources periodicals from various engineering societies, most notably the *Verein Deutscher Ingenieure* (VDI) founded in 1856 and the *Verband Deutscher Diplom-Ingenieure* (VDDI) founded in 1909, Gispen argues that the campaign for professional status and the protection of inventor rights undertaken by engineering societies such as the VDI and VDDI throughout the 18th and early 19th centuries, as well as the conflicts between these societies, were part of a "...unique and peculiar convergence of developments originating in the early 19th century and the dynamics of industrial capitalism after 1850."[29] These conditions differ markedly from the experience of American engineers. This divergence, Gispen argues, explains the inclination of German engineers towards National Socialism.[30]

Gispen argues that the unique experience of German engineers becomes evident when the differences between the experience of German and American engineers with regards to Patent laws are examined. In relation to patent laws, Gispen focuses on the concept of the "company invention," codified in the 1877 Patent Code, which he feels is central to the conflict between industry and engineers. The "company invention" refers to

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[29] Kees Gispen, New Profession, Old Order: Engineers and German Society, 1815-1914 (Cambridge: University of Cambridge Press, 1989), pp. 6 and 202 and. 1-2.

[30] Ibid., p. 2 **and** Kees Gispen, Poems in Steel Socialism and the Politics of Inventing from Wiemar to Bonn (New York: Berghan Books, 2002), p. 6.

the belief, held by late 19th and early 20th century industrialists, that the majority of inventions are not the creation of a single inventor working on his own but rather come as a result of a systematized process of multiple researchers working in industry laboratories.[31] Engineers, however, considered an invention as a work of art like a sculpture or a painting from a great artist-- a creation which stemmed from individual genius and creativity.[32] According to Gispen, the 1877 German Patent Code attempted to downplay the inventor to the greatest extent possible.[33] The minimal inventor rights of the 1877 Patent Code were largely the result of the lobbying of industrialists, such as Werner Siemens, and their intention to "press science and invention into the service of capital."[34] In contrast to this, the early American patent system encouraged technical innovation by encouraging and protecting the inventor.[35] Consequently, Gispen argues that the struggle German engineers faced with regards to patents and inventing, and which was fought so passionately, never occurred in the United States.[36] It was this struggle, according to Gispen, which placed German engineers in a position different from their American counterparts, and induced the former to see National Socialism as the solution to the crises of German modernity.

Though both Gispen and Herf are essentially pro-*Sonderweg* historians Gispen's ideas regarding the engineers' struggle for professional status, inventor rights and their support of the National Socialist camp contrast markedly with Herf's. For Gispen, at the center of these theoretical debates, lies the engineers' continued struggle to escape being

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[31] Gispen, Poems, p. 42.
[32] Ibid.
[33] Ibid., p. 25.
[34] Ibid., p. 27.
[35] Ibid., p. 25.
[36] Ibid., p. 4.

turned by capitalism into a mere cog in the machine of "the company invention" and to avoid the social leveling of the left. Gispen demonstrates how middle class technical professionals were squeezed from both sides in political and occupational terms and ultimately turned to the extreme right and the Nazis. The passing of the 1877 Patent Code was the first step in turning the middle-class engineers and technicians against capitalist industry and the government. German engineers felt exploited as a result of the "company invention," and this attitude of discontent continued to grow until the National Socialist seizure of power. Nazi views of inventor rights dovetailed with the longstanding demands of the engineers. Just as the engineers saw invention as a spark of genius, the Nazis saw inventing as a distinct and unique expression of the Aryan spirit and the German will to power. To demonstrate his point Gispen highlights the support given to individual inventors and engineers by the Nazi regime. He chronicles the 1936 reform of the 1877 Patent Code, in which the concept of the company invention was replaced by a policy of inventor rights, as well as the founding, in 1934, of the Department of Inventor Protection, which evaluated inventions submitted by individuals and offered financial support depending on the perceived value of the invention.[37] Consequently, Gispen sees the German path to National Socialism based not on an irrational embrace of *völkisch* anti-modernism, but instead on a professional ideology of the inventor/genius.

In his recent study of early 20th century German intellectuals' response to technological modernity, German historian Thomas Rohkrämer also takes issue with Herf's arguments. First, he challenges the assertion that "reactionary modernists" fused the language of culture, politics and technology. Rohkrämer sees early 20th century German cultural and technological critics as thinkers, such as Walther Rathenau, the

[37] Ibid., p. 206.

engineer Carl Weihe, Julius Goldstein, and Eduard Mayer, as thinkers who, even though they understood the inevitability of technological advance, were very cognizant of the problems that were the shadow of technology. Some believed that these dangers were an unfortunate and unavoidable aspect of technology that could not be escaped, while others believed that if they adopted new positions with regard to technology, technology could lead, to use Rohkrämer's phrase, to "eine andere und bessere Moderne." Rathenau, for example, felt that there could be an integration of technology and industry without a degradation of German culture and a mechanization of daily life, that technology could be made a servant of middle class culture.[38] As opposed to fusing culture and politics, these thinkers were concerned with weakening class structures, a corrupting of German culture, environmental consequences leading to the destruction of nature, and the mechanization of life due to an integration of technical systems into everyday life. [39]

Second, Rohkämer disagrees with Herf's assertion that these men were irrationalists.[40] Rohkrämer defines two kinds of irrationalism: the rejection of the belief in a rational world and the rejection of rationalism as method.[41] He argues that while men such as Ludwig Klages definitely were irrationalist in terms of the first definition, they were men who believed in rationalism as method, in the use of reason as the chief faculty for deducing truth, and as such can not be judged irrational.[42]

Finally, Rohkrämer challenges Herf's attempt to characterize these thinkers together as "reactionary modernists." According to Herf's definition, all reactionary

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[38] Thomas Rohkrämer, Eine Andere Moderne: Zivilisationkritik, Nature und Technik in Deutschland 1880-1933 (Munich: Paderborn, 1999), p. 112.
[39] Ibid., see pp. 71-117 for a discussion of Rathenau.
[40] Ibid., p. 18.
[41] Ibid.
[42] Ibid.

modernists have favorable attitudes towards technology. Rohkrämer argues that this is not the case. He divides technological thinkers into groups on the basis not of their political connections but rather by their views of technology, and the actions they thought necessary to place technology in the beneficial service of culture and society. One group of thinkers, including Walther Rathenau, whose writings argued that technology had to be forced to serve the middle class, felt that the German people could force technology into the service of society through an ethical reflection, which would teach that materialism should be subordinate to a higher cultural worth.[43] Engineers also figure prominently in this group; they regarded technology as a necessity in the struggle against nature as well as a cultural achievement akin to artwork.[44]

A second group of thinkers, popular around the turn of the century, placed nature, naturalism, and life at the center of the debate instead of technology. Ludwig Klages, in his 1913 work, Human and Earth, was one of the first thinkers to discuss the environmental danger of technological modernization.[45] Thinkers such as Ludwig Klages and Frank Fischer, author of 1907's Wandering in a Dream, and 1917's Our Wanderings, believed that the rational materialism inherent in technology conflicted with the historical design of the German people and the nostalgic German soul. This conflict created a "double morality" among the German people which disguised the danger of technology or covered it up with the veil of a happier future driven by the materialism of technology. Additionally, these thinkers argued that the only way to stem the danger technology posed to nature and the German soul was not to give primacy to ethical and moral thought with the intention of achieving of cultural goals, but rather to re-embrace

[43] Ibid., p. 112.
[44] Ibid., pp. 66-67.
[45] Ibid., p. 168.

nature and reject technology. Consequently, Rohkrämer argues that this second group of thinkers, by contrast to the first, was ardently opposed to technology.

While Herf argues that National Socialist modernity can be characterized by its incomplete incorporation of Enlightenment ideals, as well as its embrace of irrationalism, recent work on Nazi racial and extermination policies emphasize the rational technocratic aspects of Nazi perspectives on the use of technology. Götz Aly and Susanne Heim argue that it was the infusion of modern organizational and rational technocratic methods with Nazi ideology that eventually turned "vague ideological notions into principles of action" and "practical programmes," and eventually led to the holocaust. [46] In their study of the "architects of annihilation," Aly and Heim demonstrate that while the social scientists and economic planners of the Third Reich did not embrace Nazi ideology, the latter gave them a vast amount of freedom to implement their ideas on a massive scale.[47] Men such as Helmut Meinhold, the executive head of the department of economics at the Institute for German Development in the East and the economist Rudolf Gater, head of the 'Office of the Government General,[48] were not driven by Nazi ideology but were intellectuals who saw a chance at advancement and an opportunity to have their academic theories put into action in the east. Aly and Heim argue that the evidence left behind by these men show their arguments to be cool and level headed, and that they pushed forward with their plans to bring about a "socially modern" east that would be in the best position to bring about a technologically and industrially modern Germany. Aly and Heim, regard

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[46] Gotz Aly and Susanne Heim, Architects of Annihilation: Auschwitz and the Logic of Destruction, translated by A.G. Blunden (Princeton: Princeton University Press, 1991), p. 288.
[47] Ibid., p. 287.
[48] Ibid., p. 149.

the organizers of the Holocaust as extreme technocrats concerned not with racism so much as with rationalism, logic, and demographic theories.

For Aly and Heim the science of demographic economics was the most important application of science to Nazi ideology, especially the fixation of German intellectuals on the "maximum efficient population" or "overpopulation" in the east. According to Aly and Heim,

> as we read their notes and reviews we noted a recurrent paradigm: time and time again the argument came back to the 'over-population problem'. Whatever their area of expertise — be it agricultural policy, the 'Jewish question', specific branches of trade and commerce or the way ahead for colonization and resettlement policy — and whatever the territorial focus — the Government-General, south-east Europe or the occupied portions of the Soviet Union — the assumption that there is an underlying "over population" or "population pressure" runs like a red thread through the secret reports and published works alike of these political advisors.[49]

The theory of "maximum" or "efficient" population was a form of demographic economics that argued for a maximum population in a given area based on the resources in the area. According to Aly and Heim, German political advisors during the Third Reich believed in this notion and used it to turn rhetoric such as "race", "soil", and "blood" into scientifically and intellectually founded concepts.[50] The need to create an area that could house new German settlers from an area outside Germany and still be economically prudent required that the populations of the new territories be "socially engineered." This effort to solve the "population problem" in the east led eventually to the holocaust.

In his study of the WVHA (*Wirtschaftsverwaltungshauptamt*) or Business Administrations Main Office of the SS, Michael Thad Allen also argues that ideology and

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[49] Ibid., p.283.
[50] Ibid., p. 288.

rationality were the driving force behind the holocaust. Just as Aly and Heim argue for ideological compromise on the level of state economic planning, Allen observes similar activity on an institutional level. Allen believes that it was not one single ideology or environment, such as a disillusioned middleclass or reactionary modernism, which led to the horrors of National Socialism, but rather a "plexus of ideologies" -- "a complex network" of "branching, even partial systems of ideals"-- which were responsible.[51] Allen demonstrates this "plexus of ideologies" in his examination of the SS leaders' obsession with modern technologies, which they thought would lend an aura of modernity to the SS and help force cultural and industrial changes to Aryan ideals.[52] The SS's attempt to incorporate modern methods of production and modern technology into a variety of industries demonstrates the desperate need of SS leaders to combine their ideal of modernization with their goal of serving the German national community.[53] The most notable example Allen cites is the German Earth and Stone Works, founded in 1938 as an SS enterprise. Arthur Ahrens, the SS officer in charge of the operation, invested immense SS resources in equipping the factory with the most modern methods of production, despite evidence that these new machines were far inferior in terms of production than the old fashioned ring kiln. Allen argues that Ahrens purchased these machines for no reason other than Ahrens' and the SS leadership's obsession with technology and the aura of modernity.[54] Additionally, the SS blindly invested resources in any sort of technology that they thought would give the SS and Germany an aura of modernity. Examples of these technologies included a "newly patented pepper mill" and

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[51] Michael Allen, The Business of Genocide (Chapel Hill: The University of North Carolina Press, 2002), p. 11.
[52] Ibid., p. 68.
[53] Ibid., p.14.
[54] Ibid., p. 67.

a scientific cure for hoof and mouth disease, both of which turned out to be fraudulent schemes.[55]

For Allen, the "plexus of ideologies" is at the center of the SS goal of defining Germany as a modern state, which Allen feels can only be understood if modernity is not equated with ideas of rationality and Enlightenment reason.[56] Consequently, Allen disagrees with Herf's assertion of a burdensome ideological contradiction. Rather, Allen argues that a contradiction can only exist if it is assumed that Enlightenment reason equals modernity and that technological rationality is a derivative of the Enlightenment.[57] Instead, for Allen the process of "modernization" are ideologies that attempt to "fix a distinct set of norms and political systems to industrial changes by insisting that their vision represents the one vision open to humankind...." [58] For Allen, the SS leaders and the WHVA were masters of combining ideologies in an attempt to accomplish this goal.

Furthermore, Allen does not see Herf's "cultural politics" as the focus for the engineering professionals of the Third Reich. Allen argues that engineers such as Kurt Wisselinck, a mid-level manager working for the SS and Gerhard Weigel, a top slave labor manager and organizer of countless SS building brigades were far more concerned with achieving ideological consensus.[59] Since Allen argues that ideology is "embedded in the quotidian tasks of bureaucratic operations," he clearly sees engineers being far more focused on aspects of professional achievement than "cultural politics."

Allen's assertions regarding a "plexus of ideologies" and Rohkrämer's study of early 20th thinkers provide a useful context for a re-examination of Herf's work on the

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[55] Ibid., pp. 61-62.
[56] Ibid., p. 272.
[57] Ibid., p. 13-14.
[58] Ibid., p. 273.
[59] Ibid., pp. 2 and 50 and 14.

relationship between German intellectuals and technology during the Weimar era. Herf attempts to show that German thinkers such as Jünger, Spengler, Freyer, Sombart, Schmitt, and others could "reconcile technology and unreason."[60] In doing so Herf gathers all of these thinkers under "the ideal typical construct" he terms "reactionary modernism." However, Herf fails to realize that the complex ideas and the men who expound them cannot be so easily brought together under one heading; nor can all plans for "technological modernization" fall under the same definition. Herf fails to consider varied understandings of the differing definitions of modernity in the writings of Spengler, Jünger, and German engineers. Nor does Herf recognize that these men were approaching the subject of modernity from different viewpoints. Thus, Spengler wrote as a philosopher of history, Heidegger as a philosopher, and Jünger first and foremost as a literary figure. As Kees Gispen demonstrates, engineers were immersed in a discourse regarding professional status and compensation and thus, wrote from a professional's perspective, addressing issues which dealt with their role as professionals in a modern industrial nation. Thus, as opposed to Herf's reading of early 20th century German intellectuals as thinkers who discussed modernity and technology from the perspective of the reactionary modernist, this thesis demonstrates that each of these authors defined modernity from different perspectives. This is important because of Herf's use of a normative definition of modernity to claim that these men were not anti-modern. However, this thesis argues that these men were not necessarily judging modernity so much as defining it. Consequently, this study demonstrates that any examination of early

[60] Herf, p. 2.

20th century Germany and its intellectuals must consider that there are many competing definitions of modernity at work as opposed to any singular definition.

II. Oswald Spengler

The Faustian inventor and discoverer is a unique type. The primitive force of his will, the brilliance of his visions, the steely energy of his practical ponderings, must appear queer and incomprehensible to anyone at the standpoint of another Culture, but for us they are in the blood.[61]

-Oswald Spengler (1926)

Oswald Spengler's philosophy of history and cultural decline, The Decline of the West, outlines the complex relationship that Spengler felt existed between culture, nature and technology. As indicated by John Farrenkopf, Spengler, like the men he considered his predecessors, Schopenhauer and Nietszche, attacked the ideas of historical determinism and Enlightenment notions of a natural human progress throughout history.[62] Instead of seeing progress, Spengler defined modernity as the culmination of the cultural decline of the western European nations. Spengler established a complex set of inter-relations between culture, mathematics (numbers), the natural world, economics and technology in order to explain the decline. Technology is integral for Spengler because he feels that it is the expression or actualization of a culture's will. Spengler's view of technology is not judgmental, but rather ambivalent and, furthermore, in terms of modernity, Spengler believes that technology has become a driving force behind the decline of the west as a result of its effect on economics. These ideas run counter to Herf, who argues that Spengler's main theme is the reconciliation of irrationalist and romantic

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[61] Oswald Spengler, The Decline of the West: Volume II, translated by. Charles Atkinson. (New York : Alfred Knopf , 1926), pp. 501-502.

[62] John Farrenkopf, "The Transformation of Spengler's Philosophy of World History," *Journal of the History of Ideas* (1991): 468 and 474.

thought with enthusiasm for technological advance and that Spengler's "target was money [economics] and not the machine."[63]

As Spengler writes in Man and Technics "Technics in man's life is conscious, arbitrary, alterable, personal, inventive. It is learned and improved. Man has become the creator of his tactics of living.... And the inner form of this creativeness we will call culture...and the man's creations are the expressions of this being in *personal* form."[64] For Spengler, the complex relationship between culture, nature, math, and technology is based on "will" and "actualization." Culture is the actualization of the human soul, while math and technology are actualizations of culture. Nature, which is understood and defined by math, is a function of culture. Math is actualized through technology which in turn interacts with nature and thus affects culture. "Will," can be defined as ideas, thoughts and philosophies, while "actualization" of such things is an attempt to give them some type of form in reality. Spengler's lament in regards to modern philosophers as opposed their predecessors demonstrates the difference between "will" and "actualization." Spengler writes, "What they do not possess is a real standing in actual life. Not one of them has intervened effectively, either in higher politcs, in the development of modern technics, in matters of communication, in economics, or in any other big actuality, with a single compelling act or idea."[65] Thus, despite the great ideas of these men, Spengler despises their inability to put their ideas to any real use. In contrast to the lack of "standing in actual life," Spengler lauds the merits of the classical philosophers such as Pythagoras, as well as Confucius, Goethe and Leibniz. According to

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[63] Herf, pp. 49 and 58.
Oswald Spengler, Man and Technics, translated by Charles Atkinson (London: George Allen and Unwin ltd., 1932), pp. 30-31.
[65] Oswald Spengler, The Decline of the West: Volume I, translated by Charles Atkinson (New York: Alfred Knopf, 1926), p. 42.

Spengler, "Confucius was several times a minister,"[66] and "Pythagoras was the organizer of an important political movement."[67] He showers praise on Goethe, because Goethe accurately predicted the dates of the Suez and Panama canals and was concerned with their economic ramifications, and took an interest in American economic life and machine technology. Leibniz is privileged because he "conceived or cooperated in a number of major political schemes."[68] Thus it becomes clear that Spengler defines the difference between "will" and "actualization" in these examples as one of active interference in the vital areas of culture such as politics and economics.

The concepts of "will" and "actualization" are further applied on a much larger scale to the themes of culture, numbers and eventually technology. For Spengler, numbers are an important link between culture and technology. Numbers are actualizations of culture and technology is an expression of numbers, and therefore of culture.

Spengler links numbers and culture, stating "And so the number-thought and world-ideas of a culture are related, and by this relation, the former is elevated above mere knowledge and experience and becomes a view of the universe, there being consequently as many mathematics --as many number worlds-- as there are higher cultures."[69] Each culture possesses its own specific type of number-world and this number-world is a direct expression of that culture's soul. Spengler writes:

> There are several number worlds as there are several Cultures. We find an Indian, an Arabian, a Classical, a Western type of mathematical thought and corresponding with each a type of number – each type fundamentally peculiar and unique, an expression of a specific world feeling, a symbol having a specific

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[66] Ibid.
[67] Ibid.
[68] Ibid.
[69] Ibid., p. 70.

> validity which is even capable of scientific definition, a principle of ordering the becoming which reflects the central essence of one and only one soul, viz. the soul of that particular culture.[70]

Spengler then ties numbers and technology together with the statement, "A high mathematical endowment may, without any mathematical science whatsoever, come to fruition and full self-knowledge in *technical* spheres."[71] Spengler's belief in the connection between culture, numbers and technology is extended to mathematical systems:

> The style of any mathematics which comes into being, then, depends wholly on the culture in which it is rooted, the sort of mankind it is that ponders it.... The idea of Euclidean Geometry is actualized in the earliest forms of Classical ornament, and that of the infinitesimal Calculus in the earliest forms of Gothic architecture, centuries before the first learned mathematicians of the respective cultures were born.[72]

The specific examples Spengler uses to demonstrate the different actualizations of different cultures are generally tied to architectural technology. He refers to Doric temples and gothic cathedrals, as well as to the pyramids as technologies which are "*mathematics in stone.*"[73] Spengler also states that, "All great personalities of the Classical world form a self contained group, whose spiritual habit is definitely different from that of all great men of the Arabian or Western Groups."[74] He goes on to discuss how radically different all aspects of public and private architecture and city planning are in every classical city from Syracuse to ancient Rome, from Arabian to Western world

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[70] Ibid., p. 59.
[71] Ibid., p. 58.
[72] Ibid., p. 59.
[73] Ibid.
[74] Ibid., pp. 109. Here Spengler is defining habit as follows: The term "habit" is used of a plant to signify the special way, proper to itself, in which it manifests itself, i.e. the character, course, and duration of its appearance in the light-world where we can see it. By its habit each kind is distinguished, in respect of each phase an each part of its existence from all examples of other species. We may apply this useful notion of habit....and speak of the habit of Indian, Egyptian or Classical Culture..."

cities. Spengler even contrasts the "Western tendency to straight-lined perspectives and street-alignments (such as the grand tract of the Champs-Elysées from the Louvre, or the Piazza before St. Peter's) with the almost deliberate complexity and narrowness of the Via Sacra, the Forum Romanum, and the Acropolis, whose parts are arranged without symmetry and with no perspective."[75]

In addition to architecture, Spengler discusses tools (technology) used in sculpture to demonstrate the cultural manifestation of technology. Spengler contrasts the Euclidean use of the chisel in sculpting versus the Roman use of the drill:

> Even in Rome itself, since the time of Hadrian, the sculptor made constant use of the drill, which was wholly repugnant to the Euclidean feeling towards stone for whereas the chisel brings out the limiting surfaces and *ipso facto* affirms the corporeal and material nature of the marble block, the drill, in breaking the surface creates effects of light and shade, denies it.[76]

The Euclideans created a technology, the chisel, which was an actualization of the "will" of the Euclidean culture or their feeling towards stone, while the Romans actualized their feeling towards stone with a different technology, the drill. Clearly Spengler sees an important link between the "will" and the "soul" of a culture and its actualization through both numbers and technology. Spengler also sees the the same important link occurring through technology's actualization of numbers.

It is also important to note that Spengler sees technology as a mirror of the true value of a culture. Since technology actualizes numbers and culture it displays the real soul of the culture. Spengler's attitude is demonstrated by his discussion of painting and architecture technology versus other, less artistic forms of technology. In this instance, he

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[75] Ibid.
[76] Ibid., p. 116.

argues that certain types of technology, far more than art or architecture, truly display a culture:

> To me the depths and refinement of mathematical and physical theories are a joy: by comparison, the aesthete and the physiologist are fumblers. I would sooner have the fine mind begotten forms of the fast steamer, a steel structure, a precision lathe, the subtlety and elegance of many chemical and optical processes, than all the pickings and stealings of present-day "arts and crafts," architecture and painting included. I prefer one Roman aqueduct to all Roman temples and statues. I love the coliseum and the giant vault of the Palatine, for they display to me today in the brown massiveness of their brick construction the *real* Rome and the grand practical sense of her engineers.[77]

Spengler places traditional aspects of "culture" such as art and religion (temples and statues) below technology in his hierarchy of cultural actualization. Spengler feels that technology, unlike religion and art, impacts economics and politics. In a sense he celebrates the functionality of technology. Technology can move water and provide shelter. Market places can be designed and constructed to impact economics.

There is, however, a difference between Classical and modern technology. The difference can be inferred from Spengler's insistence that there is a difference between modern and classical numbers. According to Spengler, the Classical man is limited to the small and the near. The Greek has no word for space and all Classical men consider home to be only that which is within his visual range and no more. Spengler considers the polis to be "the smallest of all conceivable state forms," and to possess short term political policy only.[78] Meanwhile, the western world is concerned with the vast ideas of infinity. In sum, "The classical mind as unquestioningly devoted and limited itself to the study of the small and the near as ours has to that of the infinite and ultra-visual."[79] This cultural

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[77] Ibid., p. 43-44.
[78] Ibid., p. 83.
[79] Ibid., p. 84.

trait is consequently expressed in the differing "numbers" of Classical and Western thought.

This difference in "numbers" between Classical and Western culture is important since it implies that there will also be crucial differences between the natures of Classical and Western or modern technology. According to Spengler, "The method common to all – the only way of actualizing itself that the soul knows – is the symbolizing of extension, of space or of things; and we find it alike in the conception of absolute space that pervades Newtonian physics, Gothic cathedral-interiors and Moorish mosques."[80] Spengler's focus on space is so great that H. Stuart Hughes feels that it is the main theme with regards to Spengler's discussion of mathematics.[81] Since the key method of actualization is one of space and thinking about space constitutes the key difference in Classical and Western culture and numbers, it follows that there will be a key difference between modern and Classical technology with regards to space. Indeed, Spengler's discussions of Classical technology are, for the most part, focused on architecture and city planning. These types of technology deal with small areas of space. Spengler's use of these examples fits with his assertion that "The classical mind [is] unquestioningly devoted and limited itself to the study of the small and the near..."[82] However, Spengler equates modern technology with Western society's fixation on the infinite and the vast. For example, when Spengler mentions how he prefers "the fine mind begotten forms of the fast steamer,"[83] he uses the adjective "fast," indicating the steamer's ability to traverse great spaces in minimal time. Furthermore, when Spengler describes the process

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[80] Ibid., p. 80.
[81] H. Stuart Hughes, Oswald Spengler:: A Critical Estimate (New York: Charles Scribner's Sons, 1952), p. 77.
[82] Ibid., p. 84.
[83] Ibid., p. 43.

of the soul's actualizing as the symbolizing of extension and of space and things, he discusses the conceptualization of absolute space which is found among other things in "the world embracing spatial energy of modern technics."[84] For Spengler, modern technology unlike Classical technology is able encompass the entire world, and as Hughes states, "In his will to conquer distance Faustian man has created his most eloquent symbols: The Copernican view of the Universe, the faith of the explorers, and the machines that decade by decade have produced more and traveled faster than even their inventors had considered possible."[85]

Spengler sees another difference between Classical and Modern Technology in their differing interactions with nature. According to Spengler, the Faustian man (Western) and modern technology desire to master nature and place it in a subservient role, while the Classical man and his technology sought access to the secrets of nature with little or no effort. Spengler states that Classical man

> Lacked the inner weight the fatedness of their moment, the deep necessity. Here and there men played with data (and why not?) that probably came from the East, but no one devoted serious attention to them and, above all, no one made a real effort to introduce them into the ensemble picture of life

According to Spengler, the technology of the Faustian differs in that it seeks to thrust itself onto nature and master it. Whereas the classical man pondered a way in which he could posses the treasures of nature with the least possible effort, modern man desires to shape nature according to his own will.[86] Consequently, modern technology actualizes itself in a different, more dangerous way according to Spengler. In opposition to Classical technology with its limited scope and desire only to minimize the effort needed to possess

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[84] Ibid., p. 44.
[85] Hughes, p. 79
[86] Oswald Spengler, The Decline of the West: Volume II, translated by Charles Atkinson. (New York : Alfred Knopf , 1926), p. 501.

the "treasures" of nature, modern technology is a world embracing space shattering means to dominate nature and bend it to man's will.

The final difference between modern and classical technology for Spengler stems not from technology itself, but rather from the difference in the wills of the men who create it. According to Spengler, Classical technology, such as triremes, are little more than "glorified row boats," while onagers and catapults were "mere substitutes for arms and fists."[87] The reason for Spengler's derision is that he feels Classical technology lacks "the inner weight, the fatedness of their moment, the deep necessity,"[88] required for true creativity and inventiveness. The inventor is not discovering or inventing, he is simply achieving through "flukes."

However, modern technology and the Faustian inventor are quite different. The will and "deep necessity" which were lacking in Classical technology are present in abundance in modern technology:

> The Faustian inventor and discoverer is a unique type. The primitive force of his will, the brilliance of his visions, the steely energy of his practical ponderings, must appear queer and incomprehensible to anyone at the standpoint of another Culture, but for us they are in the blood. Our whole Culture has a discoverer's soul. To dis-cover that which is not seen, to draw it into the light world of the inner eye so as to master it – that was its stubborn passion from the first days on. All its great inventions slowly ripened in the deeps to emerge at last with the necessity of a Destiny.[89]

Unlike the Classical man who fiddled with data occasionally and fluked into discovery, who operated in a restricted concept of space, the Faustian man has a soul of invention which strives to the destiny of a culture.

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[87] Ibid.
[88] Ibid.
[89] Ibid., pp. 501-502.

Technology's role in Europe's transformation from culture to civilization is based on these key aspects of modern technology. Faustian man and consequently, Faustian technology's destiny as nature's master forces crucial changes on both economic and cultural spheres which are essential to Spengler's definition of modernity. Spengler pin-points the invention of the steam engine as the beginning of this cultural/economic shift. Prior to the invention of steam engine nature "rendered services;" however, after its invention nature "was tied to the yoke as *a slave*, and her work was as though in contempt measured by a standard of horse-power."[90] According to Farrenkopf, "The conflict between man and nature escalates during the industrial revolution into a veritable war. The war waged between man and nature reaches its tragic zenith in Western culture."[91] This dominance over nature allows for access to all of earth's resources and this access to billions of horse power leads to a massive population increase on a scale which is inconceivable to other cultures.[92]

This growth has a drastic effect on a culture. For Spengler, "This growth is *a product of the Machine*, which insists on being used and directed, and to that end centuples the forces of each individual. For the sake of the machine, human life becomes precious... the machine works and forces the man to co-operate."[93] Thus, just as nature has been enslaved by the machine, so have man and culture become its slave.

Faustian technology also places modern man and nature in a hierarchical relationship, in which man feels that nature is beneath him. Classical technology

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[90] Ibid., p. 502.
[91] Farrenkopf, p. 473.
[92] Ibid., p. 503.
[93] Ibid.

actualized classical man's obsession with limited space. Faustian technology actualizes the Western man's obsession with space and distance:

> Hence the fantastic traffic that crosses the continents in a few days, that puts itself across oceans in floating cities, that bores through mountains, rushes about in subterranean labyrinths, uses the steam-engine till its last possibilities have been exhausted and then passes on to the gas engine and finally raises itself above the gas engine and flies into the air; hence it is that the spoken work is sent in one moment over all oceans; hence comes the ambition to break all records and beat all dimensions, to build giant halls for giant machines, vast ships and bridge-spans, buildings that deliriously scrape the clouds, fabulous forces pressed together to a focus to obey the hand of a child, stamping and quivering and droning works of steel and glass in which tiny man moves as unlimited monarch and, at last, feels nature as beneath him. [94]

The ability to overcome nature's boundaries, to defeat the spatial power of nature's vast expanse has given the Faustian man the confidence that he is above nature. Additionally, this ability to overcome nature's boundaries has given man a sort of god complex in that it "...delivers sacred Causality over to man and by him, with a sort of forseeing omniscience is set in motion, silent and irresistible."[95]

The final key aspect of modern technology manifests itself in relation to the economy. Herf argues that Spengler is not an anti-technology thinker, but rather that Spengler's target is money and money thinking.[96] However, Herf's argument is difficult to accept because Spengler sees the modern economy as an economy of the machine in which technology is central. According to Spengler, "That which we call the national economy today is built up on premises that are openly and specifically English. The industry of machines, which is unknown to all other Cultures, stands in the centre as though it were a matter course and without men being conscious of that fact, completely

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[94] Ibid.
[95] Ibid., p. 504.
[96] Herf., p. 58.

dominates the formulation of ideas and the deduction of so-called laws."[97] In this new machine economy, traditional economic castes such as peasants, hand-workers, and merchants are being replaced with new kinds of producers, who have risen to importance as a result of the machine's evolution. The new figures are the entrepreneur, the factory worker and the engineer. In the economy of the machine the entrepreneur and the factory worker are slaves to the machine. The engineer, however, is the master of the machine, he is a priest of technology. According to Spengler, "It is the engineer who is remotest from Classical law-thought, and he will see to it that his economy has its own law, wherein forces and efficiencies will take the place of Person and Thing."[98]

Another way in which the economy is affected by Faustian technology and the machine economy is the alteration of Classical money-thinking into Faustian money thinking. Classical money thinking considers "money as magnitude", while Faustian money thinking sees "money as function."[99]

In the Classical world, money is considered as a quantity and as nothing more. Objects can accordingly be quantified by having a money value assigned to them or being transformed into money. Spengler demonstrates Classical thought through several examples. He discusses how the Roman disappointment at the lack of actual currency in Briton during Caesar's conquest was offset by the number of slaves that could be converted into currency. He also discusses how the melting down of statues into gold and the sale of Corinthians as slaves after the fall or Corinth was a natural transformation of objects into money.[100]

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[97] Ibid., p. 469.
[98] Ibid., p. 505.
[99] Ibid., p. 486.
[100] Ibid., p. 489.

Faustian money thought differs substantially in that it sees money as function. Spengler dates the beginning of this modern money thought at 1494 with the invention of double entry book keeping by Fra Luca Pacioli.[101] Double entry book-keeping for Spengler is "*a pure analysis of the space of values*,"[102] which is essential to the differences in Classical and Faustian Money thinking. According to Spengler, "The Classical economy was ordered, like the cosmos of Democritus, according to *stuff and form*. A stuff, in the form of a coin carries the economic movement and presses against the demand unit of equal value-quantity at the place of use. *Our* world economy is ordered by *force and mass*."[103] Spengler then goes on to explain that

> Thinking in money has subjects and objects: those who by force of their personality generate and guide money, and those who are maintained by money. Money of the Faustian brand is the force distilled from economy-dynamics of the Faustian brand, and it appertains to the destiny of the individual (on the economic side of his life destiny) that he is inwardly constituted to represent a part of this force, or he is on the contrary nothing but mass to it.[104]

The Faustian method of thinking in money, as opposed to thinking of money as quantity, has placed man in a different type of relationship to the economy. Man no longer uses a money system based on magnitude; instead, money now is a function which defines the modern economy in terms of force and mass.

Spengler also again mentions the steam engine, only this time it is in the context of money thought:

> The whole world economy since the discovery of the steam engine has been the creation of quite a small number of superior heads without whose high grade work everything else would never have come into being. But this achievement is of creative thinking, not a quantum, and its value is not to be weighed against a

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[101] Ibid., p. 490.
[102] Ibid.
[103] Ibid.
[104] Ibid., p. 493.

> certain number or coins. Rather it *is* itself money – Faustian money, namely, which is not minted, but *thought of as an efficient centre* coming up out of life – and it is the inward quality of that life which elevates the thought as to the significance of a fact. *Thinking in money generates money* – that is the secret of the world economy.[105]

Thus, Spengler exposes what he feels is the crucial aspect of the modern machine economy, that thinking in money generates money. No longer is money a quantifiable object which can be assigned as value to another object as it was in the Classical world. Instead, money has become some type of abstract concept which is a realization of creativity and technology.

Spengler's vision of modernity is the transformation of the Classical world into the Faustian world, which he considers to be the decline of culture into the technological money thinking world of civilization. Technology, money-thinking, and numbers all change, according to Spengler, from the Classical world to the modern Faustian world. These metamorphosed versions are, in culmination, of what modern Western culture consists. They are the actualization of a changed culture at the zenith of its decline. Technology is of great importance to Spengler because it plays a contradictory role as the actualization of culture and numbers (which actualize culture) and as something that affects culture through its effects on areas such as the natural world and the economy.

With regards to Spengler's philosophy of history, Farrenkopf writes, "history is the tragic, irrational odyssey of human will towards catastrophe. The world will is the irresistible, demonic ethos which shapes human history contrary to rational criteria, in

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[105] Ibid., p. 492.

opposition to humankind's wishes that it could be otherwise and to its frustrated ideals."[106]

For Spengler, the modernity he defines is not necessarily able to be evaluated in terms of "good" or "bad," but rather he feels that it is the result of the world will, the destiny of the Faustian man. Regardless of desire or conscious choice, the Faustian man's soul is driven to discover and to create the technology which somehow actualizes, creates and defines modernity and at the same time affects cultural changes. Furthermore, Faustian technology is superior to its predecessors. Where classical man fumbled about in creation, the Faustian man has brilliant visions and deep seated necessity which force the creation of modern technology. Technology is the destiny of the Western man.

Technology also figured prominently in the writing of Ernst Jünger, another important German thinker of the Weimar era. However, unlike Spengler who saw technology as the destiny of the western man, Jünger argued that technology and its role in the Great War were central to the creation of both the modern world and a new breed of worker-soldier This is one of the most substantial differences between the ideologies of Jünger and Spengler. While Spengler saw the new producers of the world to be engineers, factory workers, and entrepreneurs, Jünger argued that the worker-soldier would replace both the bourgeoisie and the proletariat as the leader of a new world dominated by technology. In a sense, for Jünger, modern man was the destiny of technology.

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[106] Farrenkopf, pp. 477-478.

III. Ernst Jünger

"There it was that the dust first drank the blood of our trained and disciplined youth. Those fine qualities which had raised the German race to greatness leapt up once more and in dazzling flame and slowly went out in a sea of mud and blood"[107]

-Ernst Jünger (1920)

With the publication of five books and over 100 essays during the Weimar period, Ernst Jünger became one of Germany's foremost literary figures.[108] The topics Jünger addressed in his literary work ranged from his memoirs of the Great War, in 1920's In the Storm of Steel, to his description of a utopian new world in 1932's The Worker. Unlike his contemporaries, such as Erich Maria Remarque, Jünger's writing was unabashedly bold in his description of the war as a manly, invigorating experience, which had removed the youth of his generation from the boring middle-class lives they had despised. Jünger depicted the war as an experience that created unbreakable bonds between the members of the front generation and revitalized the German nation. For Jünger, an essential aspect of this experience was created by the battlefield dominance of modern technology in the Great War. Themes of technology's influence also manifest themselves in Jünger's later work such as The Worker.

Consequently, Jünger is of great interest to Herf in his study regarding reactionary modernism. In relation to Jünger's standing as a "reactionary modernist," Herf states that Jünger "sought to reorient attitudes towards technology among the right wing

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[107] Ernst Jünger, The Storm of Steel, translated by Basil Creighton (London: Chatto and Windus, 1929), p. 110.
[108] Herf, p. 70.

intellectuals of the Weimar republic," and explains Jünger's contribution to reactionary modernism on several levels.[109] Most importantly, Herf contends that Jünger believed technology could aestheticize politics and halt German cultural decline. This belief led Jünger to reify technology through a constant contrast between the "lifeless and mechanized human body [and] the animated and self moving instrument of human will that is modern technology."[110] However, Jünger does not necessarily reify technology so much as he reifies man's interactions with technology, and uses them as the foundation of his definition of modernity and the process of modernization. Writing based primarily from his experience as a storm troop leader in the Great War, Jünger defined modernity as being an age driven by man's interaction with technology. For Jünger, modern Germany and the modern world were the children of the *Materialschlacht* (battle of materials) in which technology reigned supreme, their gestation period being the First World War. According to Jünger, the Great War was "the father of all things... our father as well. It hammered, chiseled and hardened us into what we are.... As long as life's oscillating wheel rotates inside us this war will remain the axle around which it hums."[111] The war was the marker of humanity's passing into modernity and the modern world. Additionally, Jünger clearly uses the "Dandy" archetype, in the tradition of Baudelaire and Wilde, as his model for the character of the storm trooper and consequently, the utopian worker-soldier. Thus, Jünger's literary influences play an important role in his definition of the modern man and the modern world.

Jünger placed the Great War in such a privileged position because he believed it was the anvil against which the hammer of technology forged the new man and the new

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[109] Ibid.
[110] Ibid., p. 71-72.
[111] Herf, p. 73.

modern world. War transformed man and bonded him to a new community of those who had experienced the *Fronterlebnis* (front experience). Herf describes Jünger's "new man" as follows:

> He becomes a new man with a "granite face, a voice that rattles order" with the precision of a machine gun, a body that is "smooth, lined, lean...with chiseled features, eyes hardened under a thousand horrors." War as a ritual of rebirth and transfiguration produces men like "steel forms" racing through battlefields in tanks or flying over them in planes. Here emerged the "new man, the storm pioneer, the elite of central Europe. A wholly new race, intelligent, strong and full of will. What emerges here in battle... tomorrow will be the axis around which life will revolve faster and faster."[112]

The crucial difference between the Great War and previous conflicts was the dominant role technology played in the Great War. The Great War revealed for the first time the awesome power of technology and the way it could dominate humanity and kill people in immense numbers. Weapons such as the machine gun and modern artillery revealed the frailty of mankind but at the same time presented the opportunity for men to experience the rebirth and renewal of masculine virtues. As Jünger wrote in, In the Storm of Steel,

> We had left the lecture-room, class-room, and bench behind us. We had been welded by a few weeks' training into one corporate mass inspired by the enthusiasm of one thought... to carry forward the German ideals of '70. We had grown up in a material age and in each one of us there was the yearning for great experience, such as we had never known. The war had entered into us like wine. We had set out in a rain of flowers to seek the death of heroes. The war was our dream of greatness, power and glory. It was a man's work, a duel on fields whose flowers would be stained with blood. There is no lovelier death in the world...anything rather than stay at home, anything to make one with the rest....[113]

Jünger had longed for a chance to escape the monotony of his secure life and the war provided this chance for him and all the men of his generation. It was the experience of man pitted against the deadly power of war technology, according to Jünger, that created

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[112] Ibid., p. 75.
[113] Jünger, p. 1.

the new man who would stride forth and govern the modern world. Also, it was the realization of this modern technology that would create the world that needed to be governed.

Jünger's literary work contains descriptions of both the process which forged the new man and the new world in which he would live. Jünger's earlier works, such as Battle as Inner Experience (1922) and In the Storm of Steel, describe his realization of the creation of the new world through the Great War, battle, and the experience of combat. His later works, including some essays and most notably The Worker examine the roles of the new man and technology in the post war period.

Jünger's philosophy concerning modernity is perhaps born out of the necessity to discern meaning from the Great War, which left Germany not only crippled in an economic and political sense but also shamed and humiliated at the hands of her enemies. Unlike many of his contemporaries, Jünger did not subscribe to the theory of "not defeated in the field but rather betrayed at home."[114] Instead, Jünger considered the war to have victors and vanquished on both sides of the trenches. According to Thomas Nevin, Jünger considered the victors to be those who had come away from the war with an understanding of the Great War and its purpose.[115] As Jünger states in Copse 125, the war was not about material gains or losses, and could not be explained in terms of causality, rather, "...it was a shaping of a world yet hidden in the future that was bound to the possession or the loss of such clods of earth."[116] As such Jünger explained the Great War as the expression of an "idea" which it both revealed and to which it was

[114] Thomas Nevin, Ernst Jünger and Germany (Durham: Duke University Press, 1996), p. 74.
[115] Ibid., p. 73.
[116] Ibid., p. 73.

prelude.[117] The idea, which Jünger believed was expressed by the war, was that humanity had shown itself able to vanquish technology by overcoming the killing machines of the modern world. In regards to this Thomas Nevin writes

> No matter the devastation, the war was a victory of morality over the material that threatened to crush it. The war proved that men could bear more than was ever believed possible; their power to resist made them winners in the race with their own machinery. So it would always be, Jünger maintained, so long as humanity is the master, not the slave of its creations.[118]

For Jünger, the Great War illustrated the ability of humanity to overcome the machine, and proved that the human soul was stronger than the technology that humans had created and pitted against themselves.

In, In the Storm of Steel, Jünger clarifies this idea. He describes the worst hours of the war as the ones in which you sit alone in the trench or in your hole waiting to be destroyed by "a lump of metal that will crush you to a shapeless nothing." In this instance Jünger describes himself as "a victim of a pitiless thirst for destruction" created by technology. However, in these moments Jünger also believed that man must look inside himself in order to find the strength to stand fast

> Well, why don't you get up and rush into the night until you collapse in safety behind a bush like an exhausted animal? Why do you hang on there all the time, you and your braves? There are no superior officers to see you.
>
> Yet someone watches you. Unknown perhaps to yourself, there is someone within you who keeps you to your post with the power of two mighty spells: Duty and Honor. You know that this is your place in the battle, and that a whole people rely on you to do your job. You feel, 'If I leave my post, I am a coward in my own eyes, a wretch who will ever after blush at every word of praise'. You clench your teeth and stay.[119]

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[117] Ibid., p. 71.

[118] Nevin, p. 73. J.P. Stern also elaborates on this theme, which he terms the "Dear Purchase." Stern's look at important German writers of the early 20th century era indicates that German modernity was obsessed with a search for personal validation and worth which could only be achieved through a total supreme self sacrifice. See J.P. Stern, The Dear Purchase (Cambridge: Cambridge University Press), 1995.

[119] Jünger, Steel, p. 180.

The man who clenches his teeth and stands fast in the trench, despite the merciless onslaught of technology is the archetype of the new man who is to emerge victorious from the war. For Jünger, the Great War was definitive evidence of man's superiority to the machine, it was the triumph of the human soul and humanity's will over the crushing hammer of modern technology.

Jünger's understanding of modernity also rested on his belief that a new man was created as a result of the war. This new man was the result of the soldiers' interactions with technology, which pitted them directly against the terror of the machine gun, the horror of modern artillery and its storm of steel, fire, and blood. Technology's impact on the war experience is of such magnitude that Jünger describes the battlefield as a machine on several occasions. In, In the Storm of Steel, Jünger writes,

> The modern battlefield is like a huge, sleeping machine with innumerable eyes and ears and arms, lying hidden and inactive, ambushed for the one moment on which all depends. Then from some hole in the ground a single red light ascends in fiery prelude. A thousand guns roar out on the instant, and at a touch, driven by innumerable levers, the work of annihilation goes pounding on its way.
>
> Orders fly like sparks and flashes over a closed network, spurring on the heightened destruction in front and bringing up from behind a steady stream of fresh men and fresh materials to fling into the flames.[120]

Later, Jünger refers to a drunken man reeling about in the trenches in terms of technology: 'I overlooked a drunken fellow who reeled bawling between the files of my company, for now any harsh words could do only harm. Training was over; and now we came to business, not a wheel of the machine was to be checked."[121]

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[120] Jünger, Steel, p. 118.
[121] Ibid., p. 244.

Due to the extensive impact of technology, the battlefield experience had reached a new level of importance in the First World War. The "war of material" as Jünger refers to it, had forced soldiers to adapt. He writes

> It was the days at Guillemont that first made me aware of the overwhelming effects of the war of material. We had to adapt ourselves to an entirely new phase of war. The communications between the troops and the staff, between artillery and the liaison officers were utterly crippled by the terrific fire. Dispatch carriers failed to get through the hail of metal and telephone wires were no sooner laid than they were shot into pieces. Even light signaling was put out of action by the clouds of smoke and dust that hung over the field of battle. There was a zone of a kilometer behind the front line where explosives held absolute sway.[122]

In addition to soldiers adapting to a new style of warfare, the experience of war had been irrevocably altered by modern technology, particularly artillery. Jünger writes of how when one is forced to endure an entire night of artillery fire it numbs the mind to such an extent that a soldier cannot remember his own name or count to three.[123]

Jünger also recounts his own confused experience of artillery fire, in which a direct hit from a shell rendered him momentarily mad. After the explosion Jünger became disorientated and wandered off aimlessly instead of taking charge as the company commander, "I will make no secret of it that after a moment's blank horror I took to my heels like the rest and ran aimlessly into the night."[124] Only after a brief spell in a shell hole did he recover enough to regroup his men. The final scene of this episode sees Jünger on his knees weeping at the sight of a young soldier who, previously mocked by

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[122] Jünger, Steel, pp. 107-108.
[123] Ibid., p. 70.
[124] Ibid., p. 245.

his comrades for being too weak to carry munitions, was carrying two cases of missiles after having survived the artillery attack.[125]

Jünger's description of his confusion illustrates the effects of modern war on man's psyche. "It was not until I had fallen head over heels into a small shell hole that I understood what had happened. Only to hear and see no more! Only to get away, far away and creep into a hole! And yet the other voice was heard: 'You are the company commander, man!'"[126] For Jünger, war was an experience of fear tempered with the need for humanity's soul to regroup and endure the onslaught of the machine. This is an experience that only modern warfare, with its fearsome artillery and other technology, can make possible. It is this experience that forges men into "steel-forms," as is evidenced to Jünger by the young fellow carrying his cases of munitions. Prior to the attack the young soldier had been unable to do so, but now, the human will to endure was swelling inside him. He would carry the cases, and thus, he would overcome the machine. This idea of man overcoming the machine has been elaborated on by Omar Bartov, who argues that a new elitist ethos was born out of the Great War. This ethos was that of man merging with the machine and mastering it. For example, the new soldier mastered technology by riding in tanks and flying in airplanes. According to Bartov, there were two major implications of this new ethos: First, there was a renewed sense of heroism and personal chivalry which the Great War had demolished, and second, the increasing sophistication of the technology alleviated a large portion of the psychological burden linked to killing.[127]

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[125] Ibid., p. 58.
[126] Ibid., p. 245
[127] Omar Bartov, Murder in Our Midst (Oxford: Oxford University Press., 1996), p. 26.

It is important to note the difference in Jünger's descriptions regarding conflicts between men and conflicts between man and machine. In contrast to the mood of grim determination and human will overcoming the crushing might of technology, when Jünger writes about human conflict or interaction he stresses qualities such as honor, mercy, and humanity. A tussle between a French soldier and a German Lieutenant begins with the calling out "Rendevouz!" by the German, to which the Frenchman responds, "Ah non."[128] After a successful foray by Jünger's unit in which a large number of prisoners were taken, Jünger describes his encounter with the enemy commander: "His first words showed that I had a man to deal with. 'We were surrounded.' He could not rest until he had told his enemy why he had allowed his company to be taken prisoners so quickly."[129] Jünger then tells how they discussed various matters and finally parted with the shaking of hands. In another example of man to man interaction, Jünger entered the English trenches and encountered a wounded English soldier. About to shoot him, Jünger's hand is stayed when the man shows him a family photograph. Instead, Jünger shoves the man half-heartedly and continues down the trench. Colliding with an enemy officer, Jünger seizes the man by the throat and hurls him to the ground. Ordered by a German major who is behind him to shoot the man dead, Jünger only responds, "Let him see how he has escaped the hot and annihilating will of a German storm trooper."[130] The "half-friendly shove," that Jünger gives the wounded English officer and the acknowledgement between the German and the French soldier before their man to man combat mark war as almost romantic and chivalrous. Indeed, most of In the Storm of Steel reads as though it were an adventure novel recounting the daring exploits of a

[128] Jünger, Steel, p. 204.
[129] Ibid., p. 229.
[130] Nevin, p. 59.

dashing lieutenant, young and arrogant, facing the chance of death with abandon. However, the sections that deal with the effects of technology become grim and terror-filled. Jünger suggests the worst moments of the war not to be engaging the enemy, but rather the lonely waiting, knowing at any moment life could end, smashed by the steel fist of "a lump of metal that will crush you to a shapeless nothing."[131] The experiences of mercy, honor, and respect could be found, for Jünger, in any conflict in the past. It is the seething technology that creates the unique experience of the *Fronterlebnis*.

So what then of the modern man, forged by the *Fronterlebnis*? Jünger realized as a result of his "four years schooling in force," that life had no meaning unless it was pledged for an ideal. This ideal during the war had been to fight for the Fatherland; thus, all soldiers had given their life meaning, in that they had made this pledge.[132] Additionally, they had all mastered technology by clenching their teeth and standing fast in their trenches, dugouts, and shell holes. Consequently, this was a generation that was capable of governing the modern technological world created by the Great War. The warrior was a man with purpose and ability who had emerged victorious from the sea of blood and mud that had drowned out the dazzling flame of Germany:

> Though material force cast us, apparently, to the earth, yet we learned once and for all to stand for a cause and if necessary to fall as befitted men.
>
> Hardened as scarcely another generation was in fire and flame, we could go into life as though from the anvil; into friendship, love, politics, professions, into all that destiny had in store. It is not every generation that is so favored.[133]

The Great War had in Jünger's eyes created a favored generation which had emerged from the trenches and was ready to stride forth victorious into modernity.

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[131] Jünger, Steel. 180.
[132] Ibid., p 316.
[133] Ibid., pp. 316-317.

It is in his later works, particularly The Worker, and his essay on technology for the journal *Die Standarte*, that Jünger articulates the role of the new man and technology in the modern technological world. The Worker, released in 1932, is Jünger's vision of the future. Jünger's future state is one in which technology has made all ideologies anachronistic. It is a world in which Nationalism, Communism, and Capitalism are no more. In their place stands a technocracy which is manned by soldier-workers (no doubt the favored generation of the *Fronterlebnis*), who seek only to maintain the freedom they have attained through an obedience to work and an affirmation of technology. Hallmarks of this new society include its universal character in which every thing is a marriage of industrial and technological tasks and the removal of the ideas of comfort and security, leaving work as the only true goal.[134]

These soldier-workers would replace the Prussian middle class, which Jünger violently railed against. Jünger believed that the bourgeoisie had become, along with ideology, anachronistic. The reason for this belief falls in line with Jünger's assertion that comfort and security had become outmoded ideals. Jünger felt that the ideals which the middle class held most dear were those of security and comfort, and as a consequence the middle class had become anachronistic.[135]

The new "ideology" of the future will center on work. According to Nevin, "Jünger wants to impose upon the notion of work an energetic compass that first de-coins its standard value as toil and then identifies it as an elementary process as life itself."[136] Jünger relates the traits that characterize work as being similar to freedom. Again, according to Nevin, "Jünger sketches a landscape where all prerogatives of comfort begin

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[134]Nevin, pp. 115-116.
[135] Ibid., p. 118.
[136] Ibid., p. 123.

to vanish. In the new age, everything is to be conceivable as work: not only the performance of brain and heart, but all manifestations of love, art, science, faith, war-everything." Through work one experiences the calling to realize the mastery of form and achievement that is central to this new world.[137]

Technology plays a central role in this new world as a result of two factors. The first is the way technology affects the ability of man to achieve the important mastery of form. Technology, according to Jünger, continually affects the ability of mankind to achieve mastery because it is constantly placed in a position of primacy over that of the self.[138] The second is how technology functions as a catalyst for the re-defining of work. Nevin writes:

> The catalyst lies in technology's transformation of work. It has collapsed the quasi feudal class differences which nineteenth century industrialization had perpetuated. The new language of work is its pervasive movement: differences between mechanical and organic labor are increasingly obscured, so that work operations take on the character of cellular and planetary movement.[139]

Since all people now embrace work, work has been able to create a universal society that is devoid of class, indeed even devoid of the differentiation between the organic process of human labor and that of the machine. It is movement which is central to this uniformity. Just as Jünger noted in his war novels, when the artillery barrages began, and the war of material was at its terrific peak, there were no distinctly human characteristics which served to remind the soldier of what he was. Men could not count to three or remember their names. The only thing which could suffice to give the soldier his bearing was movement.[140] It is the same in the world of The Worker: there are no longer any

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[137] Ibid., pp. 122-123.
[138] Ibid., p. 125.
[139] Ibid., p. 126.
[140] Ibid., p. 70.

human differences such as thought, political ideology, or culture. There is only the "pervasive movement" of the worker, merged with his task by the gears of the machine.

In addition to the new "ideology" of work, Jünger takes great pains to discuss the worker-soldier of the new world. Jünger sees the bourgeoisie and the proletariat as equally insubstantial to the modern world. As noted already the bourgeoisie are an outmoded class because the things by which they have defined themselves, comfort and security, are both to be inconsequential in the future. The proletariat is also insubstantial. According to Nevin, "He [Jünger] submits that those who toil in the factories will remain puppets of the old order so long as they fail to see that, relative to modern society, they stand not in a condition of opposition but of total otherness."[141] Unlike the modern man, the worker-soldier, who has mastered technology, the proletariat is the slave of technology. Thus, neither the bourgeoisie, nor the proletariat, are capable of being leaders in Jünger's modern society.

Instead, the worker-soldier, already versed in the language of movement from his experience in the trenches of Belgium and Northern France, will lead. Unlike the proletariat who are slaves to the machine and toil in the factories, the worker-soldier has already conquered the machine by standing fast in the trenches and thus asserted himself as a master of technology. Again we see Bartov's theme of the mastery and merger of man and machine in Jünger's literature. This mastery is important for Jünger. In an essay on the machine for *Die Standarte* he makes two ideas clear: First, he rejects the idea that humanity is inherently superior to the machine and argues instead that the machine needs to be mastered. Second, Jünger contends that technology possesses the ability to provide

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[141] Ibid., p. 123.

"higher and deeper satisfaction," as long as it could be forced to human purposes.[142] This mastery is the role of the worker-soldier. Additionally, haven given his life meaning by fighting for the Fatherland, he understands the necessity of pledging his life to an idea and will be ready to pledge himself to work, technology and movement.

Another issue that needs to be examined is the perspective from which Jünger views modernity. Jünger writes from the perspective of an author and this standpoint plays a key role in the how he describes the interactions between technology and the soldier, and consequently, in his definitions of modernity and the modern man. According to Karl Heinz Bohrer, "The central theme of Ernst Jünger's early work is the representation of the modern appearance/form of "terror" (*des Schreckens*)."[143] As Bohrer points out, Jünger was greatly influenced by writers such as Baudelaire and Wilde, specifically, by the concept of the Dandy character, or Dandyism.[144] According to Bohrer, "Oscar Wilde, Huysmans, and again Baudelaire gave Jünger the Dandyist attitude to follow. Above all, however, Jules Barby d'Aurevillys study of the Dandy, Du Dandysme et de G. Brummel, which appeared in 1845 and was translated by Richard Schaukal into German in 1911, laid out the definitive definition of the Dandy type, which Jünger's writing represents and reflects."[145] This idea of the Dandy plays a crucial role in Jünger's work, especially with regards to his definition of modernity and the new man.

The Dandy is a sort of subversive character, a criminal even, who in some way elevates beauty and the aesthetic above all else. The Dandy is also alienated from society, and in Böhrer's words, "...has here lost the move to the sociology of the modern

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[142] Ibid., p. 93.
[143] Karl Heinz Bohrer, Die Äesthetik des Schreckens (Munich: Carl Hanser Verlag, 1978), p. 75.
[144] Ibid., p. 31.
[145] Ibid.

metropolis."[146] As a result of this isolation, violence plays a key role in the character of the Dandy. A classic example of the Dandy is Dorian Gray, the chief miscreant of Oscar Wilde's, The Picture of Dorian Gray. Gray's desperate attempts to elevate beauty and forestall the inevitable process of aging lead him to commit all sorts of atrocities as he becomes more of an outsider as a result of his perpetual youth and handsome looks.[147] A further example is that of the sadist or the sexually deviant person, whose deviance takes the form of violence. The work which best articulates this is Swinburne's Sadism.[148]

Jünger's obsession with the Dandy archetype becomes quite clear with regards to his writing, as the Dandyist influence clearly manifests itself in the character of the storm trooper. The storm trooper, who has lived through the *Fronterlebnis*, is a dandy character. He is isolated from the modern city experience of the bourgeoisie. Being a soldier, he is also violent since storming trenches amidst a raging battle is no light work. As a consequence of the Jünger's literary obsession with the Dandy and his typing of the storm trooper as such, he naturally exploits the technology of the war for his Dandyist literary purpose. Just as the Dandy character is a murderer, criminal and sadist who understands his acts as acts of beauty rather than acts of deviance, so to the storm trooper elevates violence, and thus, technology to beauty through his understanding of it. Consequently, it is evident that to a great extent the *Fronterlebnis* and Jünger's philosophy of the new man are inspired by the literary concept of the Dandy. The modern man is excluded from pre-war society and he reifies technology (as the object which creates violence) and elevates it to beauty.

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[146] Ibid., p.33.
[147] Ibid., pp. 32-33.
[148] Ibid., p. 35.

As Herf contends, Jünger does indeed discuss technology in the language of culture. However, the chief purpose of this discussion for Jünger is to create a definition of modernity. Jünger's definitions of modernity and of the modern world are first and foremost shaped by his experience during the Great War. The modern world stumbled awkwardly into the Great War, but left it a sleek powerful world of movement and technology. The war had given birth to a new man and had provided this new privileged generation with the *Fronterlebnis*. For Jünger, the modern world was one in which man needed to overcome the machine to escape being enslaved by it. The men in the trenches had already accomplished this through surviving the battles and artillery barrages. Consequently, they would lead the new order, as the worker-soldiers. Just as they pledged themselves to fight for the Fatherland during the war, they would give their lives over to work, seeing it in every aspect of life. There would be no differences, no ideologies, only the movement of humans and machines combined in the perfect mastery of achievement. Additionally, Jünger situated himself as an author when approaching his definition of modernity, and as such we see the influence of literary themes, for example Dandyism, in his work.

Jünger was not the only German intellectual to see the modern world and modern man as the result of technology. Martin Heidegger's definition of modernity also considered technology to be an essential aspect of the modern world. However, in contrast to the worker-soldier's utopia, Heidegger saw a modern world that possessed great danger for mankind. For Heidegger, modern technology was responsible for the modernist "world view," of which key aspects included rationalized industrial production

processes, and more importantly, mankind's understanding of "to be" as merely raw material for a self-enhancing technological system.

IV. Martin Heidegger

"Our age is not a technological age because it is the age of the machine; it is an age of the machine because it is the technological age."[149]

-Martin Heidegger (1954)

Martin Heidegger's 1927 work Being and Time deals with what the author considers the most important philosophical question: What does it mean for human beings "to be?" According to Heidegger, what it means "to be" has been adversely affected by modern technology, and thus his later works, such as The Question Concerning Technology, (1954) address this issue. Given Heidegger's examination of technology as well as his status as one of Weimar Germany's most important intellectuals, Heidegger is an important part of any examination of German intellectuals and their understanding of modernity.

Jeffrey Herf only briefly includes Martin Heidegger in his study and he makes sure to clarify that Heidegger is the exception to the rule with regards to right-wing German thinkers. Heidegger does not fit into the reactionary modernist mould because, in Herf's words, "he was not able or willing to reconcile his version of anti-modernist protest with modern technology."[150] Herf argues that the latent Nazism in Heidegger's philosophy, as outlined in Being and Time, provides a context which allows Heidegger's work to be considered a plea for politics of cultural revolution.[151] Herf contends that Heidegger was not able to reconcile his desire to see Germany save the world from the "soulless technology of the Russians and the Americans" with his disgust for the

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[149]Michael Zimmerman, Heidegger's Confrontation with Modernity (Indianapolis: Indiana University Press, 1990) I.
[150] Herf. p. 109.
[151] Ibid. p. 112.

technology that would be needed to accomplish this task.[152] Consequently, Herf claims that Heidegger's inability to reconcile technology and anti-modernist thought helps focus the achievement of the reactionary modernists who did just that.[153] Thus, Heidegger's inclusion here is almost necessary since Heidegger demonstrates, by Herf's own admission, that all right-wing political intellectuals do not necessarily fit under Herf's "ideal typical construct" of reactionary modernism.

Heidegger's definition of modernity is intricately tied to his definition of modern technology. According to Michael Zimmerman, Heidegger defines modern technology as, "the contemporary mode of understanding or disclosing things, which makes possible both industrial production processes and the modernist worldview."[154] Heidegger considers the modernist worldview to be conflated with a rationalist, scientific, commercialist, utilitarian, anthropomorphic, secular worldview.[155] Heidegger's definition of modernity is similar to Spengler's since Heidegger places the modern world in the final stages of a decline that began with the ancient Greeks. Unlike Spengler, however, Heidegger argues the decline is occurring in western humanity's understanding of what it means "to be."[156] Heidegger defines "being" as the way in which entities choose to reveal themselves, and how these revealings shape history.[157] Furthermore, for Heidegger, the modern worldview understands "to be" to mean the ordering of humanity as "raw material for a self enhancing technological system."[158] For Heidegger, this

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[152] Ibid. p. 115.
[153] Ibid.
[154] Zimmerman, I.
[155] Ibid.
[156] Zimmerman, XIV.
[157] Ibid., XV.
[158] Ibid.

singular mode of understanding represents a supreme danger, in that it makes humanity unable to experience truth.[159]

Heidegger's most important ideas regarding technology are articulated in "The Question Concerning Technology," which Heidegger first gave as a lecture to the Bavarian Academy of Fine Arts in 1953. However, as Richard Wolin indicates, "Heidegger's critique of technology, the pre-dominant theme in his later work is of a piece with the critique of modernity originally elaborated in the Nietzsche lectures."[160] These lectures, as well as several essays, were composed between 1936 and 1941, thus Heidegger's 1953 work is very relevant to his philosophical thought of the late 1930s.[161] Heidegger begins by stating his desire to discover the essence of technology. First, Heidegger examines what he feels is the contemporary view of what technology is. For Heidegger, the contemporary defintion of technology consists of two parts: First, technology is a means to an end. Second, technology is an activity set to by humans. Together these constitute the unified phenomenon: "For to posit ends and procedure and utilize the means to them is a human activity."[162] This definition, for Heidegger, is the instrumental definition of technology. It is important to note that for Heidegger, though this is a correct definition, it is not a true definition. For Heidegger, a correct definition fixes on something pertinent in whatever is being considered, however a correct definition does not speak to the essence of the thing under consideration. Thus, the instrumental definition does not speak to the essence of technology. However, Heidegger

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[159] Martin Heidegger, "The Question Concerning Technology, "The Question Concerning Technology and Other Essays," translated by William Lovitt (New York: Harper and Row, 1977) p. 27.
[160] Richard Wolin, The Politics of Being: The Political Thought of Martin Heidegger (New York: Columbia University Press) p. 160.
[161] Ibid., p. 133.
[162] Heidegger, p. 4.

feels that a true definition, a definition that speaks to the essence of an object, can be obtained by way of the correct.

From this means-ends human activity, understood as the correct definition of technology, Heidegger moves to the issue of causality because he feels that "wherever means are employed and ends are pursued, wherever instrumentality reigns, there reigns causality."[163] Heidegger cites philosophy as the teacher of the four main modes of causality. These are *the causa materialis*, *the causa formalis, the causa finalis,* and *the causa efficiens*. The *causa materialis* is the material out of which an item is fashioned.. The *causa formalis* is the form of an item. The *causa finalis* is the end for which the item is fashioned. Heidegger uses a silver chalice which is necessary for a sacrificial rite as an example of the *causa finalis*. The *causa efficiens* is that which brings about the fashioned item, for example a sculptor who carves a statue. Of these four causes, Heidegger feels that since it is generally felt that to cause something is to bring it into being, the standard for all causality is set by the *causa efficiens*.

Next, Heidegger questions causality. He sees the idea of responsibility as intricate to causality. Since each mode of causality assists in the construction of the item, each is in part responsible for the item's creation. Additionally, Heidegger reverses roles in a sense in that just as the causal modes are responsible for the item (in his example the silver chalice) the item is indebted to all four of the causal modes for its final form. Heidegger states:

> The chalice owes thanks to the silver for that out of which it consists. But the sacrificial vessel is at the same time indebted to the aspect (eidos) of chaliceness. Both the silver into which the aspect is admitted as chalice and the aspect in

[163] Ibid., p. 6.

> which the silver appears are in their respective ways co-responsible for the sacrificial vessel.[164]

So in a sense, since the chalice is indebted to all four causal modes, all four are tied together and all are responsible to some extent for the chalice. Thus, the *causa efficiens* is not the only type of causation.

However, Heidegger wants to make sure that there is no confusion between the idea of responsibility and indebtedness. The four modes of causality and responsibility are different from indebtedness in that they bring something into appearance.[165] Heidegger puts it as follows: "They let it [the 'something'] come forth into **presencing**."[166] This means that since the four causal modes or responsibilities start the item on its way to its arrival as a final form they are responsible for it.

Heidegger calls this starting down the path to arrival at a final form provided by the four responsibilities **occasioning**; thus, in the same way that there are four modes of causality, which are four modes of responsibility, there are four ways of occasioning that all work together in that they allow an item to presence.

Since the four **occasionings** brings something to presence, according to Heidegger, they must be ruled over by "a bringing that brings what presences into appearance."[167] In order to fully explain this bringing, Heidegger quotes Plato's Symposium: "Every occasion for whatever passes over and goes forward into presencing from that which is not presencing is *poiesis*, is **bringing-forth**."[168]

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[164] Ibid., p. 7.
[165] Ibid., p. 9.
[166] **Note:** I am boldfacing Heideggger's terms to make them easier to recognize.
[167] Ibid., p. 10.
[168] Ibid., My emphasis.

What is this **bringing-forth** for Heidegger? He states that it is of the 'utmost importance' that **bringing-forth** be held in its full magnitude, that as well as the Greek definition volunteered by Plato's Symposium, it must be also be seen as the 'arising of something out of itself'.[169] Heidegger refers to this as *Physis,* which to him is *poiesis* at its zenith. Additionally, Heidegger examines how **bringing-forth** occurs. For Heidegger, bringing-forth only can occur in as much as something which is concealed moves forth into the realm of unconcealment. This is a process identified as **revealing**. Heidegger considers revealing to be equated with "truth." As such it becomes clear in Heidegger's philosphy (he states it openly) that technology is far more than its correct instrumental definition, far more than a simple means/ends human activity, technology is a means of revealing. This is important because of Heidegger's equating of revealing with truth. Consequently, technology can be seen as a way to truth.

So what form does this revealing take? For Heidegger, it is not the *physis,* the self revealing, but instead a **challenging**. According to Heidegger, modern technology differs from earlier technology because of its relationship to physics, for modern technology and physics are intricately linked. According to Heidegger, modern technology differs from its predecessor technology in that it relies on the precision of physics as an exact science. However, Heidegger is certain to point out that modern physics is also dependent on modern technology, as this technology is essential to the experiments that are conducted as a part of physics research. Modern technology, through its tie to modern physics, reveals and stores nature as energy. It **challenges** the earth to show the energy locked in coal, it challenges the rivers and streams to reveal the energy locked in their flow. Heidegger makes sure to clarify that although a windmill, for example, uses the wind to

[169] Ibid., p. 10.

create energy, it does not challenge it to do this, whereas, the stream will be damned for a power plant. This newly revealed energy is thus transformed for the purpose of storage so that it may be called at a later time. When the energy is called upon, it is transferred about continuously so that the revealing never ceases.

Essentially, modern technology is a continuous revealing of nature as energy. This revealed energy is then 'ordered to stand-by'. Heidegger refers to this ordering to stand-by as the **standing reserve.** This ordering is accomplished by man, though unconcealment is outside of human agency.

There is a challenging that challenges man into the role of the orderer. Heidegger calls this next level in the hierarchy **Enframing**. Heidegger explains it thus

> Enframing means the gathering together of that setting-upon which sets upon man, i.e., challenges him forth, to reveal the real, in the mode of ordering, as standing-reserve. Enframing means that way of revealing which holds sway in the essence of modern technology and which is itself nothing technological.[170]

The essence of technology is thus represented in **Enframing** and as a consequence the essence of technology is an essence that allows man to start on a way to revealing nature as a standing-reserve. Heidegger refers this starting on a way as **destining**. Because man is the one who is challenged by **Enframing** he exists within the realm of **Enframing** and as such man is constantly under the sway of this **destining**.

It is here that the issue of human freedom arises. For Heidegger, freedom is essentially tied to what is unconcealed and revealed. Since the essence of modern technology is a revealing of nature as energy, and because man exists within the realm of Enframing which starts man on his way to this revealing, man is always near to the truth (what is unconcealed) and with it Freedom.

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[170] Ibid., p. 20.

However, in the essence of technology, for Heidegger, there also exists the supreme danger. As soon as man begins to lose sight of what the unconcealed is, i.e. of what truth is, and begins to relate to it merely as **standing-reserve**, then man faces the danger of becoming merely the **standing-reserve** also. This will also cause man to think that all he encounters is his construct, and finally that all he encounters is himself. All of these things are for Heidegger erroneous and dangerous for man. Additionally, man will also be banished to a realm where the only revealing possible is that of ordering, and according to Heidegger such a revealing masters all other forms of revealing and suppresses them. If man falls from the precipice that **Enframing** pushes him to, he will lose the opportunity to realize truth that comes from the unconcealment he has limited to the **standing-reserve**.[18] Additionally, **Enframing**, the essence of technology, has the potential, as discussed earlier, to drive out all other forms of presencing. Since presencing is related to unconcealment and unconcealment is equated to truth for Heidegger, this means that there is a danger that truth will be forced into hiding.

Heidegger's analysis of the danger that the essence of technology poses is quite correct. The evidence of this can again be seen in the relationship between modern technology and modern physics. First, as was pointed out earlier, technology's essence has forced its way to the forefront of modern physics. It shows itself as a revealing and drives out the essence of science. The second way in which the danger of technology is evident is in the idea that man becomes merely an orderer who views the unconcealed as only the **standing-reserve**. As Heidegger points out, "man's ordering attitude and behaviour display themselves first in the rise of modern physics as an exact science.

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[18] Ibid., p. 27.

Modern science's way of representing pursues and entraps nature as a calculable coherence of forces."[171] Man has from the beginning of modern science been forced into the role of the one who orders. Man no longer sees the unconcealment of nature as a way to truth, he sees it merely as an entity to be ordered as laws and rules. In this sense man has already fallen and can be seen merely as the **standing-reserve**.

Another area of Heidegger's philosophy that merits more explanation is the concept of neutrality of technology. Heidegger states, "But we are delivered over to it in the worst possible way when we regard it as something neutral; for this conception of it, for today which we particularly like to do homage, makes us utterly blind to the essence of technology."[172] What does Heidegger mean by this, and is such a statement believable? Heidegger is a disciple of the substantive theory of technology. This theory argues "that technology constitutes a new type of cultural system that restructures the entire social world as an object of control."[173] This is perhaps the most important facet that comes out of Heidegger's philosophy. Technology is not an instrument merely under human control. Its impact forces mankind to alter life, culture and society to accommodate technology. There are countless webs of human activities which surround technology, just a few of which include the practical uses of technology and its function as a status symbol. As Pacey states, when "looked at in this way technology is seen as something that is a part of life, not something that can be kept in a separate compartment."[174]

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[171] Ibid., p. 21.
[172] Ibid., p. 4.
[173] A. Pacey, The Culture of Technology (Cambridge: MIT Press, 1992), p. 7.
[174] Ibid., p. 3.

A look at the effects of rationalization in the Ruhr mining industry is effective in demonstrating the ways in which technology can institute new cultural and social systems. In 1913, 97.8% of all coal extracted from the mines was done so using hand labor and pick axes. By 1929 only 7% of the coal was extracted by hand. Conversely, between 1913 and 1929 there was a marked increase in the use of the pneumatic pick in Ruhr Mines. The percentage of coal extracted with the pneumatic pick had been insignificant in 1913 but by 1929 the pick was used to mine 87.37% of all coal.[175] This introduction of technology in the form of the pneumatic pick forced a marked change in the cultural and social systems surrounding coal workers. Traditionally, coal miners worked as small groups and were paid a group piece rate based on the amount of coal extracted by the entire group. The "rationalized" mining industry saw a shift to much larger units of workers. However, despite the larger units of labor there was much more emphasis on the individual. Workers were now spread out along coal seams and used conveyers to transport the coal they had mined. Workers found themselves removed from a traditional social circle as the focus shifted from group to individual labor. There was also a shift in the definition and types of skilled labor. Many workers who had previously been considered skilled were de-skilled by new rational methods and technology. Also, the need to use technology created a diverse selection of new skilled positions such as fitters and electricians. This transformation in the definition of skilled labor led to increased segmentation of the work force. Specifically, there was great segmentation between new skilled work and newly deskilled work, as well as old and young and employed and unemployed.[176] Thus, in this instance, as the substantive theory of

[175] Peukert, p. 115.
[176] Ibid., p. 116-117.

technology argues, technology was far from neutral; rather, it had a direct effect on both the professional and social lives of the Ruhr miners.

Heidegger's definition of modernity is clearly influenced by the fact that Heidegger approaches his task with the mindset of a philosopher. According to Michael Zimmerman, "Heidegger believed that the task of the philosopher was to discover the transcendental conditions which made possible human knowledge and action...In his analysis of modern technology Heidegger attempted to discover the conditions necessary for the possibility of our one dimensional experience as entities as raw material."[177] As Zimmerman indicates, Heidegger believes that for something "to be" means that it is "to be disclosed" or "to be manifest" and that human behaviour is shaped through reactions to how these manifestations occur.[178] For example, humans will react differently to something that manifests itself as a creature of God, as opposed to something which manifests itself as a raw material.[179] Thus, Heidegger's distrust of technology and his fears concerning its dangers are argued in philosophical terms. Unlike Spengler who defines modernity as the decline of western culture, in which technology plays a crucial role due to its affect on economics and culture, Heidegger argues that "modernity" is a mode of thought that is the result of a technological age and modern technology which has degraded humanity's ability "to be", such that humanity manifests only as raw material.

Heidegger's methodology further indicates how Heidegger is influenced by his standpoint as a philosopher. Heidegger approaches the question concerning technology by attempting to build a way to technology's essence through language. According to

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[177] Zimmerman, XIV.
[178] Ibid., XIV-XV.
[179] Ibid.

Heidegger, "The way is a way of thinking. All ways of thinking, more or less perceptibly, lead through language in a manner that is extraordinary."[180] Yet, Heidegger also feels that the appropriate realm in which to question technology and to keep an eye on the danger lurking within its essence is art.

So does it make sense then that Heidegger chooses the form that he does? When looking specifically at the role that Heidegger feels the poetic plays in art and the theories of Roman Jakobson in "Linguistics and Poetics" it is revealed that it makes perfect sense. According to Heidegger:

> The poetical brings the true into the splendor or what Plato in the Phaedrus calls to *Ekphanestaton*, that which shines forth most purely. The poetical thoroughly pervades every art, every revealing of the coming to presence into the beautiful.[181]

Additionally, Michael Inwood argues that for Heidegger, "Art is 'the letting happen of the arrival of the truth of beings as such'. This means that all art is essentially 'POETRY' or rather *Dichtung*." [182] So for Heidegger, the most important aspect of art, indeed all art, is related to poetry and the poetical.

Jakobson's theories, as expressed in "Linguistics and Poetics," discuss the way the poetic function is situated in language. Jakobson reaches several conclusions which are relevant to Heidegger. First, Jakobson says that "the MESSAGE as such, focus on the message for its own sake, is the POETIC function of language."[183] Second, Jakobson notes that "any attempt to reduce the sphere of poetic function to poetry or to confine

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[180] Heidegger, p. 1.
[181] Ibid., p. 34.
[182] Inwood, p. 20.
[183] Roman Jakobson, "Linguistics and Poetics," Closing Statement to the 1958 'Style in Language' conference, Indiana University, republished Thomas Seobok (ed.), Style in Language. (1960), p. 37.

poetry to the POETIC function would be a delusive over-simplification."[184] Finally, Jakobson argues that

> the analysis of verse is entirely within the competence of poetics.... Poetics in the wider sense of the word deals with the poetic function not only in poetry, where this function is superimposed upon the other functions of language, but also outside of poetry, when some other function is superimposed upon the poetic function.[185]

So according to Jakobson, the poetic function extends far beyond the domain of poetry to all verbal communication. More importantly, the poetic function is the message itself.

Consequently, we can see the cleverness of Heidegger's method. First, even his use of verse is informed by the poetic, thus it places his philosophical views within the realm of art and more importantly it situates it within the poetic. Also, the fact that the message, which we can take to be the meaning of the word, is the poetic function of language is important. Heidegger's method of questioning through language involves looking at the meaning of words. For example, on page 30 of "The Question Concerning Technology," Heidegger indicates that at one time *techne* was understood as art and not technology alone. By examining the meaning of words, Heidegger is looking to their message, and thus, when Jakobson is considered, Heidegger is really looking to the poetic function. In this respect Heidegger is situating his philosophy into the exact realm that he feels provides the best platform for a discussion of the essence of technology and the monitoring of the danger it possesses. Thus, Heidegger's chosen method of argument is based on his philosophical beliefs.

As Herf argues, Heidegger did not reconcile technology with the irrationalism of the German romantics; thus, Heidegger demonstrates that not all right-wing intellectuals

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[184] Ibid.
[185] Ibid., p. 40.

can be defined as reactionary modernists. He instead chose to define modernity based on his philosophical principles. For Martin Heidegger the modern technological world was the final stage in the decline of western understanding. It is from this decline in the understanding of what it means "to be" that technology arises. This modern technology makes possible, for Heidegger, the ideas of rationalism, scientism, commercialism, utilitarianism, and secularism which are characteristic of modernity, as well as production processes associated with industrialism.[186] Both modernity and industrialism are the result of another product of technology, the modern technological understanding of "to be" as the ordering of humanity as raw material for the propagation of the technological system.[187] Consequently, just as with Jünger and Spengler, Heidegger argues that technology is the essential factor of the modern world, which could not exist without it. However, unlike Jünger, who saw the new world of the worker-soldier as a utopia or the perfect state in the age of total war, and Spengler, whose cultural pessimism saw the decline of Western culture as the inevitable destiny of western man, Heidegger saw both supreme danger and the chance for salvation in the age of technology. According to Heidegger, Enframing allows man to endure such that he may one day become the guardian of truth. Furthermore, man can increase the chance of salvation by continuously reflecting on the supreme danger.[188] For Heidegger the modern man stands on a precarious ledge equally close to freedom and the supreme danger of knowing "to be" only as the ordering of raw material for the machine.

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[186] Zimmerman. I.
[187] ibid.
[188] Heidegger, p. 33. According to Heidegger, "'to save' is to fetch something home into its essence, in order to bring the essence for the first time into its genuine appearing." Thus, Heidegger feels within the essence of technology there is the potential for man's essence to be truly revealed for the first time and; thus, make man the guardian of truth.

Just as Heidegger saw technology as the essential factor of the modern world so did academically trained German engineers. However, in contrast to Heidegger's overwhelmingly negative opinion of technology's affect on the world, German engineers endeavoured to characterize technology as a positive and beneficial addition to all areas of German life. Engineers believed that technology was interwoven with every aspect of the modern world including culture, politics, economics, social reform, philosophy, industry and rationalization. As professionally trained creators of technology German engineers felt that they had a responsibility to act as guardians of technology, defending technology from negative characterization and clarifying its value to the public. As a result of this German engineers actively sought to engage all the above mentioned issues, as they felt that at base they were all essentially technological issues.

V. Academically Trained Engineers

"Both the artist and the engineer form their work out of their fantasies, both are bound by laws given to him by nature: Laws of proportion, the weight, the composition, etc. The artist is qualified by the degree of his talents, this intuitiveness to feeling and at this time the best have created their legitimacy through their own intensive study. Does it stand any different with the engineer? He also searches to bring form to an idea"[189]

-W.Benedict (1924)

German engineers, in the words of Jeffrey Herf, "devoted a remarkable amount of time to cultural politics. If he (and the profession was overwhelmingly male) was interested in the relationship between technology and culture, a German engineer would be reading *Technik und Kultur*."[190] *Technik und Kultur*, published from 1909 until 1922 as *Zeitschrift des Verbandes Deutscher Diplom-Ingenieure*, and then until 1937 as *Technik und Kultur*, was the main publication of the Verbandes Deutscher Diplom-Ingenieure. In truth, however, German engineers devoted a substantial amount of time not just to technology and culture, but to technology and all aspects of German society. Whether it concerned cultural criticism, social reform, education reform, the philosophy of technology, economics, rationalization of industry or politics, the engineers of the VDDI created discourse in the pages of *Technik und Kultur*. Thus, it is evident that the main goal of the engineers throughout the late Wilhelmine and Weimar periods was to establish themselves as critics of modernity, who, as professional creators of technology, were in a privileged position to interpret all aspects of modernity.

Throughout these diverse interpretations, the engineers sought to demonstrate two things. First, they argued that technology was the driving force behind the modern

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[189] Dr. W. Benedict, "Formen Bildung in Maschinenbau", *Technik und Kultur*, (November 1924): 107.
[190] Herf, p. 163.

world and was tied to all of the major areas modernity. Second, they attempted characterize technology as a positive force in these areas, constantly arguing for, and promoting, the positive aspects of technology. Through their role as interpreters of modernity and their occupation of technological builders engineers defined the modern world as a world which functioned through an intimate connection to technology, and was, for the most part, dependent on it.

As Herf asserts German engineers do indeed discuss matters concerning culture. There are two main claims with regards to the engineers' cultural discourse. First, engineers considered themselves cultural creators akin to artists. They felt that they were both capable of, and obligated to, create technology that was beautiful. Furthermore, they likened the creative process of the inventor to that of the artist. As a result of this comparison, the engineers felt that they had a responsibility to characterize the relationship between technology and culture as positive. They accomplished this by addressing both issues of technological pessimism and through criticizing acts of culture (film, art) which they felt depicted technology as negative.[191]

Engineers argued that they should be considered cultural creators just like artists for several reasons. First, they argued that the creative process of art and that of technology were the same. Second, engineers argued that technology could be beautiful like art in both form and function. Duisberg Diploma Engineer Dr. W. Benedict's discussion in "Formenbildung im Maschinenbau," from the November 1924 issue of *Technik und Kultur* ,highlights both the engineers' belief in the comparable creative processes of art and technology and the belief that engineers should and did create works

[191] See Herf's Reactionary Modernism.

that were not only functional, but also beautiful. When comparing the creative process of engineers and artists, W. Benedict wrote:

> Both the artist and the engineer form their work out of their fantasies, both are bound by laws given to him by nature: Laws of proportion, the weight, the composition, etc. The artist is qualified by the degree of his talents, this intuitiveness to feeling and at this time the best have created their legitimacy through their own intensive study. Does it stand any different with the engineer? He also searches to bring form to an idea.[192]

Benedict felt the artist and the engineer were the same since they were both bound by the same laws of nature and an identical creative process. In fact for Benedict engineers and artists are so similar that in the past they were practically indistinguishable:

> Man has since the oldest times never failed to clothe the creator of technology in the robes of the artist. From the decorated tools of the ancient man, the goblets and lamps of the Greeks, from the knight's armor of the middle ages until the gothic and Moorish steam machines, which man built in the middle of the previous century.[193]

In addition to his comparison based on creative process, Benedict also compares the engineer to the artist by illustrating how contemporary acts of technology and engineering can be beautiful. Benedict describes a bridge in Norway which he feels is exceptionally beautiful:

> Worth noting in the picture is the striking harmony of the iron construction with the rocky landscape, the refined vertical structure of the bridges high character as it comes towards you, the slender profile of the ironwork softens the massive impact of the cliffs.
>
> With this example it appears that it is entirely possible to give purposeful form, which can be raised to a beautiful product.[194]

In order to highlight the connection between artists and engineers, Benedict describes the bridge in artistic terms, speaking not of forces and function, but rather of composition and

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[192] Benedict, p. 107.
[193] Ibid., p. 109.
[194] Ibid., pp. 111-112..

perspective. Even his language makes a direct connection between the engineer and the artist.

Though Engineer P.K. Engelmeyer sees the creativity of the engineer expressed in technology's function, he still echoes Benedict's sentiments regarding the creative nature of the engineer/artist in "Vorarbeit zur Philosophie der Technik," published in the May 1927 issue of *Technik und Kultur*. Engelmeyer argues against the notion that engineers only see the function of the machine. In contrast, he states that creativity is the central focus of the engineer:

> The thinker who is far removed from technology has often only seen in technology the machine principle. Fully privileged is the work method of the machine in modern technology. It has furnished, however, nothing else but a compound tool for a specific job. In contrast to this creativity plays a leading role in technology as it does in art. Without creativity there is no technology… [195]

Instead, for Engelmeyer the key factor in technology, as in art, is creativity. Without this creativity there would be no technology. Engelmeyer pushes this idea further arguing that the creative process of technology is just as valid as that of art:

> In the process of invention there stays always a dark point, that appears in the consciousness of the (hypothetical) solution of a technical problem. This is the same psychological moment of intuition, the "Eureka" moment, fully as meaningful as that which initiates artistic production or scientific discovery. [196]

Engelmeyer argues that this creative moment manifests itself not in terms of beauty but in terms of function: "The inventors – the technical creators- form the necessary opposition to the machine principle. Technology is a creative art like any other: only its creativity is not that of beauty but that of function."[197] The engineer's creative genius is found in the

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[195] P.K. Engelmeyer, "Vorarbeit zur Philosophie der Technik," *Technik und Kultur*. (May 1927): 89.
[196] Ibid., p. 90.
[197] Ibid.

function of the machine, unlike an artist's which is found in the beauty of his artwork. However, the moment of creative genius is still the same.

Engineers believed that since they were engaging in an act identical to other cultural creators, such as artists, that they too should be considered as cultural creators. In light of this, engineers attempted to define themselves as cultural critics. In their role as critics of modernity and culture, engineers often found themselves working to alleviate negative impressions of technology. In some instances these negative impressions revolved around perceived negative effects of technology. In other instances engineers addressed what they felt was the unnecessary rift between technology and culture. In the February 1933 issue of *Technik und Kultur*, the Vienna engineer Hugo Horowitz published an article titled "Technik, Zivilization, und Kultur,". According to Horowitz, ever since the end of the Great War there had been a rising concern regarding the destruction of mankind through technological methods of warfare and the destruction of economic life through technological means.[198] Horowitz argued that people must look to technological achievements, such as water power, which showcased technology's "true value," in order to calm their fears about the destructive nature of technology. Horowitz connected the actual value of technology to culture, arguing that the creation of technology which has a high level of "actual value," also has the potential to benefit culture. Consequently, it is the engineer's duty to consider not only the industrial and functional value of technology, but also cultural aspects in order that culture of the highest value will result from technology. Horowitz closes his article by stating, "Also, the engineer should not rise up alone in activities of civilization so that the cultural performance of these activities shall never sink to zero, but rather that in the actual value

[198] Hugo Horowitz, "Technik, Zivilization und Kultur," *Technik und Kultur* (February 1933): 18.

of culture exists the possibility that culture can achieve the highest worth."[199] Thus, he emphasizes that high cultural achievements are linked to technologies of great practical value and he cautions engineers not to focus only on the creation of technology for the sole purpose of creating a more modern world, but to consider cultural implications as well.

W. Benedict also addressed questions concerning the relationship between technology and culture. In "Formenbildung im Maschinenbau", Benedict expresses his fears regarding what he considers the opposition that engineers have created between technology and culture:

> For a long time technological construction, namely that of the machine industry, has rejected the right to beauty of form. For a long time the engineer refused the feeling for the aesthetic with the reasoning that the technical determination of the constructed form was based on its mechanical function...Man created an actual opposition between technology and art, between technology and culture even! The engineer is under a heavy burden as a representative of technology as he is not without guilt.[200]

Benedict's allocation of guilt to the engineers indicates his belief that technology and culture need to be brought together and that engineers are responsible for bridging this gap. In an attempt to accomplish this Benedict compares the engineer to the artist and urges engineers to work towards creating technologies of striking beauty such as the bridge in Norway. Both Horowitz and Benedict demonstrate the German engineers' concern with establishing both a positive image of technology and a beneficial relationship between technology and culture

Engineers also took the opportunity to act as cultural critics in their attempt to create a positive image of technology. Thus, engineers would criticize artistic works,

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[199] Ibid., p. 22.
[200] Dr. W. Benedict, "Formen Bildung in Maschinenbau," *Technik und Kultur*. (November 1924): 107.

which they felt misrepresented technology, in the pages of *Technik und Kultur*. In the May 1927 issue, Frankfurt Diploma Engineer Carl Weihe took particular exception to Fritz Lang's "Metropolis." Weihe believed that the depiction of technology in "Metropolis" was the sort of thing conjured up by men who with no understanding of technology and its creators, as well as the cultural meaning of technology, in an attempt to start a revolution against the rule of the machine.[201] It is this particular depiction with which Weihe takes issue: "In my opinion" he wrote, "schools should use the opportunity to forcefully clarify for the students, whom they cannot stop from seeing the film, the complete misjudgment of technical work on men and their culture."[202]

A similar form of cultural criticism occurs in the October 1930 issue. An engineer named Milous criticizes an artist, named Gemäldes for his unfavorable depiction of technology. Gemäldes' picture depicts a long work bench of puppets who have their arms linked through straps to a large machine of some sort. In the background of the picture there is another bench visible. A puppet sits at the bench, knocking away at a large gearwheel with triangular teeth using a hammer and chisel.[203] Milous takes exception to this depiction of technology enslaving mankind and remonstrates not only with Gemäldes, but also with the editor of the magazine in which the painting appeared, the *Berliner Illustrierte Zeitung*. He claimed that the magazine depicted a false consequence of technology: "Gemäldes tendency is often to show how the worker in industry becomes subservient to the machine. In actuality the evolution of technology

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[201] Carl Weihe, "Der Wert der Naturwissenschaften für Leben und Wirtschaft," *Technik und Kultur* (May 1927): 84.
[202] Ibid., p. 84.
[203] Milous, "Kultur-Bolchewismus," *Technik und Kultur*. (October 1930): 167.

proceeds and along the way it frees man from the machine and makes man it's master."[204] In both of these instances, Weihe and Milous enters the realm of cultural criticism in order to counter negative depictions of technology's effects on society.

German engineers also addressed issues of social reform, engaging in discourse covering a broad spectrum of social issues such as accident prevention, accident compensation and liability, and calendar reform. Furthermore, engineering organizations such as German Institute for Technical Labor Training (DINTA), which was an institute for industrial sociology and rationalization, addressed issues of rationalization and Americanization and their social effects on Germany. Throughout the discussions of these social issues, engineers worked to promote technology as an important tool for social reform.

In November 1924, A. Phillipe, a Diploma Engineer and the *Regierungs-baumeister* from Essen, wrote an article discussing accident prevention in industry. His article highlights the responsibility of the engineer in addressing the issue of accident prevention. Phillipe began his article by declaring that as a magazine promoting technology and culture, *Technik und Kultur* also had a responsibility to discuss accidents which involved technology, since the chief purpose of technology was to make a better, happier life for those who work with technology:

> Our periodical is named 'Technology and Culture', and the use of this expression indicates that our journal should serve to discuss the questions concerning the cultural meaning of technology and its progress. The question of the prevention of industrial accidents belongs here also... The chief purpose of social technology is the protection of the welfare and life of the industrial employee to effect a happy population.[205]

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[204] Ibid..
[205] A. Phillipe, "Neuzeitliche Unfallverhütung in den Gewerblichen Betrieben," *Technik und Kultur*. (November 1924): 116.

Phillipe also worked towards the engineer's goal of promoting a positive image for technology. Phillipe did so by stressing that the key to accident prevention lay not with technology or accident prevention literature, but rather, that it was the responsibility of the worker.[206] Thus, Phillipe shifted the focus away from "good" technology onto the "clumsy" worker.

Dr. Max Grünewald expressed similar sentiments in the April 1931 issue of Technik und Kultur. Grünewald's article examines the nature of the electrical accidents. He argues that it is necessary to discern the nature of electrical accidents and to prevent them from occurring, in order that technological advance will not be impaired: "The nature of electrical accidents and appropriate accident preventions... are of great social meaning to the triumphant advance of electricity in all forms of technology and daily life."[207] It is noteworthy that Grünewald sees the true value behind accident prevention in preventing technological stagnation. He ties the need for accident prevention to the positive ideas of technology and technological advance, which he refers to as "triumphant".

German engineers also addressed the issue of accidents with regards to both air and automobile traffic. In July 1914, the *Landgerichtsrat* for Cölogne, a man named Nemnich, discussed the issues of liability in air traffic accidents. Since airplanes were a new technology, questions regarding accident responsibility and compensation for injuries and damages still needed to be answered. According to Nemnich, "In the foreground stands the question of private liability for injury and damages brought about

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[206] Ibid., p. 117.
[207] Dr. Max Grünewald, "Die Eigenart des Elektrischen Unfalls," *Technik und Kultur* (April 1931): 70.

through air vehicles which don't involve the drive and flight of the person."[208] Nemnich argues that perhaps the question of liability can be resolved through an examination of the laws which apply to the railway. In the same issue there is an article which lists statistics concerning automobile accidents in Germany. Listed in the tables are a wide variety of statistics including the number of accidents for vehicles with different passenger capacities, and a comparison between Germany and other nations. The tables also list the number of people killed in both integers and percentages, as well as providing a breakdown of casualties in terms of driver, passenger, and third person.[209] Though there is no analysis of the statistics, the detail of the tables and Nemnich's concern regarding liability in technological accidents indicates that engineers were cognizant of the need to address issues involving aspects of technology, such as traffic accidents, which could be construed as negative and to overcome these negative images. If an analysis of accidents statistics and an examination of compensation strategies could make for safer and more positive experiences with technology, the VDDI and the engineering community would be behind it.

German engineers felt that as the creators of technology they had an obligation to address the issue of technological accidents. In their examination of accidents involving technology, the engineers always stressed the issue of human liability and responsibility in regard to accident prevention. They felt that men were responsible for the safe use of technology in order to ensure two things: that technology would continue its "triumphant advance" and that it would guarantee the welfare and happiness of the worker who used it.

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[208] Nemnich, "Die Haftpflicht im Luftverkehr," *Zeitschrift des Verbandes Deutscher Diplom-Ingenieure.* (July 1914): 327.
[209] Ibid., pp. 331-332.

Another example of engineers assuming the role of the social reformer can be seen in the Diploma Engineer and Dresden *Stadtbaumeister* Mierisch's call for a calendar reform in the May 1927 issue of *Technik und Kultur*. Mierisch argues for a calendar reform, from the Gregorian calendar to the Blockmann calendar. The Blockmann calendar contained 365 days in total. 364 of the days had corresponding weekday names. There was also a special day, with no weekday name, called "Midsummer's Day," which occurred between 30 June and 1 July. During leap years, another special day was added between 31 December and 1 January.[210] Mierisch argued for this reform on the basis of its social implications which he saw to be beneficial:

> Blockmann's suggestion is an eternal calendar, a calendar, which keeps astrological specifications the same year in and year out. The dates of the year always fall on the same days... That standardized and defined nature of the calendar presents a great advantage to commerce and the economy..."[211]

Though this instance is somewhat odd, it serves to demonstrate nicely the way in which engineers sought to act as social reformers. Blockmann (whom Mierisch refers to as "The Kiel engineer, Dr. Blockmann...".), created a technology in order to institute what could easily be considered an immense social reform on the grounds that a standardized calendar would prove beneficial for both the economy and commerce. Mierisch argues for Blockmann's calendar on the same grounds.

In addition to addressing issues such as calendar reform and accident prevention, engineers also engaged with issues involving the social effects of economic techniques such as rationalization and the Americanization of German society. Rationalization was based on two central trends, Fordism and Taylorism, both of which were devoted to creating the most efficient production environment possible. Taylorism used complicated

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[210] Mierisch, "Reform des Kalenders," *Technik und Kultur* (May 1927) 92.
[211] Ibid.

time and motion studies to break down individual work processes. These processes were then analyzed so that they could be made as time and labor efficient as possible. In addition time checks were used in Taylorist environments to ensure that employees were functioning in the most efficient manner.[212]

In contrast to Taylorism, Fordism strove to use technology to create a method of production which would be more efficient overall, not just create more efficient employees. Fordism advocated using mechanized production, such as the assembly line, in order to create high quality goods that could be sold at low prices. These low prices combined with high wages paid to the assembly line worker created an environment in which mass consumption could occur. The worker would be happy because he was paid a high wage and could afford the cheap material goods, while industry would profit from high sales. The attractive claim made by advocates of Fordism was that Ford's methods created greater productivity without increasing individual labor.[213] Americanism, according to Mary Nolan, "...symbolized much more than a strongly efficient modern system of production; they represented a world view, a way of life, and a set of gender relations organized around the primacy of economics and consumption but also new men and women."[214]

In November 1924, the engineer N. Stern, a Director and Diploma Engineer from Frankfurt, published the article, "Kritische Betrachtungen zum 'Ford-Buch'," in which he took issue with some of the principle tenets of Ford's philosophy regarding the economy and the worker, as outlined in Henry Ford's My Life and Work , which had

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[212] Ibid.
[213] Mary Nolan, Visions of Modernity (Oxford: Oxford University Press, 1994), pp. 47-48.
[214] Ibid., p. 108.

been published in 1922.[215] According to Stern, "Ford gives special emphasis in his contemplations to the duty of service... to him the way is 'service for profit, work for money'."[216] Stern feels that this attitude of working only for money is problematic, and he argues that Ford is able to effect these social changes only because has maintained his advantage in the market, not because they are better or more efficient.[217]

German engineers also addressed social issues through the creation of organizations such as DINTA. As Mary Nolan indicates, "Engineers played a particularly prominent role in social rationalization,"[218] and organizations like DINTA were central to this. DINTA was founded in 1925 by Albert Vögler and Karl Arnhold.[219] By the end of the 1920s DINTA had training programmes in roughly 150 to 300 German and Austrian firms and published more than 50 company newsletters which were circulated to half a million people.[220] DINTA addressed questions of productivism and individual productivity, rejected Ford's wage and market strategies, as well as celebrated modern technology while promising to minimize its harmful effects.[221]

In dealing with these key issues, DINTA sought to redefine the role of the engineer. DINTA wanted the engineer to become a "Führer" archetype, a leader and an educator whose chief role would be to modernize Germany's economy, while at the same time keeping Americanism from gripping the country.[222] This was accomplished through education of the worker. According to Nolan DINTA, "...translated sweeping and vague statements about vocational education and work centered identities; the factory

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[215] N.Stern, "Kritische Betrachtungen zum 'Ford-Buch'," *Technik und Kultur* (November 1924): 113-114.
[216] Ibid., p. 113.
[217] Ibid.
[218] Nolan, p. 184.
[219] Ibid., p. 186.
[220] Ibid., p. 187.
[221] Ibid., p. 188.
[222] Ibid., p. 185.

community, and industrial leadership into very pragmatic programmes for skilled and unskilled workers, employed men and their wives at home, the aged and the young."[223] These training programmes covered a wide variety of issues and topics. Engineer training included lectures on pyschotechnics, accident prevention, youth welfare, business management, and vocational education. As well there was a practical experience component which included work training in the Ruhr.[224] With the creation of these training programmes DINTA hoped to restructure the attitude of the worker towards work.[225] The new worker would be trained by the firm for the firms particular needs and "his relationship to work would 'allow him as an individual, despite rationalization and mechanization in a private capitalist economy, to have a livelihood, joy in work, and satisfaction in life within limits."[226]

Engineers took an active role with regards to many social issues and social reforms. They wrote about, and founded, organizations in order to combat what they felt were the debilitating effects of Fordism and Americanism on German social life. They addressed issues such as accident prevention and accident liability when technology was involved. All of this was geared towards promoting the social benefits of technology or combating social change which would have a negative impact on the image of technology.

Another major aspect of modernity which German engineers discussed heavily was that of education and education reform. The importance of education reform

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[223] Ibid., p. 179.
[224] Ibid., p. 192.
[225] Ibid., pp.189-190.
[226] Ibid., p. 189.

to engineers is evident in Carl Weihe's statement, "Through the School, for the life."[227] Engineers were concerned with all levels of the education system ranging from the gymnasium to the University. In particular they were greatly interested in the education of engineers and often felt, as Alexander Lang, a Doctor of engineering and *Patentanwalt*, stated so bluntly, "...the engineer's education should belong in the hands of the engineer and not in those of non-engineers or general departments."[228] Central to this interest in education was a desire to see technology always portrayed as a positive social and cultural influence and a curriculum that prepared man for a more technological world.

German engineers argued that an education for the modern age required a curriculum that allowed students the opportunity to study in technical fields after the gymnasium. As a consequence of this, they vehemently opposed any education reforms that restricted the study of mathematics or the natural sciences. Additionally, since they saw technology as central to culture, engineers opposed changes which they thought would limit the ability of students to engage in the cultural activity of technological invention. In the June 1924 issue of *Technik und Kultur*, Professor Max Zacharias argued against proposed math reforms, in this case a decrease in the number of hours per week spent in mathematics instruction, in the German education system. Zacharias described the proposed changes as follows: "The ministry believes that the performance across the spectrum of coming generations will not become any worse than performance up until now; what is lost in instruction time should be made up through a better method of

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[227] Weihe, (May 1927): 85.
[228] Alexander Lang, "Der Wirtschaftsingenieure," *Technik und Kultur* (August 1931): 121.

instruction."[229] Zacharias argued that the specialized method used to teach mathematics made the ministry's reforms impossible stating, "The preceding discussion shows that, it is impossible to cut back instruction time and still maintain the current level of achievement."[230] He further pressed his case against the proposed changes by arguing that if decreased instruction time meant poorer performance in the area of mathematics then the change would impede students who wished to study mathematics or engineering at university.[231] Zacharias made his final plea by linking mathematics to culture.

> Modern culture is unthinkable without mathematics and natural sciences. Man needs only too think of Plato and Aristotle, in order to see how impossible the picture of ancient culture would be without math and natural sciences or to think of the modern "Völker" with all its operations if mathematics is cut out.[232]

Zacharias opposed the reforms on the grounds that they damaged the chances of a student in the gymnasium from pursuing a technical education and that mathematics was essential to culture.

Similar sentiments are expressed by Carl Weihe. He felt that technologists needed to unite in order to ensure that there would be more focus in German education on practical life applications.[233] Weihe wrote, "...we technologists have placed a series of demands to the schools which will end in the wish: More consideration than has been given to this point, for the practical life."[234] Weihe's demands stem from his belief that technology is important to the modern world and its culture:

> Our age bears the unmistakable mark of technology. When the minister in his much criticized exposition said that, "the economic politics, the technical, and the

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[229] Max Zacharias, "Die Mathematik in der neuesten preussischen Schulerreform," *Technik und Kultur* (June 1924): 42.
[230] Ibid.
[231] Ibid.
[232] Ibid., p. 43.
[233] Weihe, (May 1927): 81.
[234] Ibid., p. 81.

> positivist age" lay behind us and now "an important historical philosophical legal" ages comes, we believed this was not so, and you, my fellow mathematicians and natural scientists, fully agree. On the contrary we take the standpoint that the technical and economic age will come first... a culture without technology is unthinkable. Today if you were to wipe out the technology of our world, destroy the railways and steam power, the loom and printing press... destroy these things and tell me what of our culture would remain?[235]

As such there needs to be instruction in both mathematics and natural sciences since, "Technology and the natural sciences are sisters." and "Math is for the natural sciences what the natural sciences are for technology."[236] In addition to an increase in math and natural science instruction, Weihe also wanted to see the importance of technology and its cultural implications discussed in all areas of education. In the October 1927 issue of *Technik und Kultur*, Weihe wrote

> It cannot be emphasized enough, that we don't want teachers of technology, but rather that the student has a better understanding of the meaning of technology and for technological thought...The schools can, in all disciplines, not only the natural sciences, but rather in all things, also in German, in history, and in religion and language instruction, point out the meaning of technology for culture.[237]

His distress at "Metropolis" is also useful here. Upset by the depiction of technology in the film, Weihe states that educators have a responsibility to clarify the issue and present a positive image of technology.

The comments of both Weihe and Zacharias expressed the engineer's desire to see an educational curriculum which kept technological considerations at the forefront. The arguments for such a curriculum were often based on cultural concerns. Both Zacharias and Weihe appealed to the cultural value of mathematics, natural sciences, and technology, declaring that no culture, in this case the culmination of artistic and technological achievements, could exist without these factors. German engineers wanted

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[235] Ibid., pp .81-82.
[236] Ibid.
[237] Carl Weihe, "Technik und Schule," *Technik und Kultur* (October 1927): 188.

an education system that taught the importance of mathematics and natural sciences in terms of cultural instruments. They also wanted an education system that fought against negative characterizations of technology.

Another aspect of education that engineers were concerned with was technical post secondary education. In some respects this concern was tied to the German fixation with regards to the science of work and the German concept of Joy in Work. As Joan Campbell has indicated German researchers in the late Wilhelmine and Weimar periods were fixated on examining the principles that made up the complex relationship between man and his vocation in an attempt to increase efficiency and productivity while doing minimal damage to the individual and German society as a whole.[238] In the October 1930 issue, Gustav Goldbeck examined engineering education in "Probleme der Ingeniuerbildung." Goldbeck believed that there was a lack of philosophy or theory of technology in the education of the engineer. According to Goldbeck, "It is clear that technical scientific education has more or less turned its back on questions of the theory of technology."[239] Goldbeck felt that a man's performance capabilities were based on his general level of happiness and well-being and that this was tied to how much he enjoyed his career.[240] The level of well-being was linked to the man's conscious, which in turn led to a philosophy of technology.[241] Consequently, Goldbeck felt that in technical schools students needed not only to gain material knowledge but also needed to develop the internal bond between occupation and life, and culture.[242] Goldbeck argued that this

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[238] See Joan Campbell, Joy in Work, German Work (Princeton, New Jersey: Princeton University Press), 1989.
[239] Gustav Goldbeck, "Probleme der Ingeniuerbildung, " *Technik und Kultur* (October 1930): 157.
[240] Ibid., p. 155.
[241] Ibid.
[242] Ibid., p. 156.

process could be accomplished through a scientific analysis and examination of technology from which a basis for technical theory could be drawn. This new theory would be the foundation of engineering education.

In the February 1933 issue of *Technik und Kultur*, K.F. Steinmetz also addressed technical schools in "Bemerkung zur Hochschulreform." Steinmetz was concerned about the effects of merging technical schools with universities, such as the union of the Breslau technical school with the Breslau University in April 1933 stating that "Undoubtedly, the separation of the evolution of technical schools, technology and technical science from the university had an advantage."[243] Steinmetz expressed his fears that combining technical schools and universities will not allow technical schools to evolve parallel to industrial technology. For Steinmetz, "the end of this evolution can only be the 'ruin' of technical schools."[244] Additionally, As Joan Campbell has expressed in Joy in Work, German Work, there was an additional concern regarding technical schools versus universities. This concern stemmed from a belief among academics that the university was a place of unbiased research. In contrast, technical schools were focused on the practical application of research. If the two were to merge the unbiased attitude of the university would be jeopardized, and as Steinmetz indicates, the ability of the technical school to apply knowledge in a practical manner would be hindered.[245]

Both Steinmetz and Goldbeck demonstrate the interest that engineers had in discussing education at the post secondary level. Though these reforms did not always stem from the same beliefs regarding culture and joy in work, they were always geared

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[243] K.F. Steinmetz, "Bemerkungen zur Hochschulreform,". *Technik und Kultur* (February 1933): 23.
[244] Ibid., p. 24.
[245] Campbell, p. 73.

towards ensuring that issues of technology would play a key role in the education of the engineer and technical workers. Steinmetz' fear that technical schools would be ruined by mixing with non-technical universities and Goldbeck's desire for a theory of technology are examples of this. Organizations like DINTA, whose purpose was to address social issues through education are also indicative of the engineer's attempts to situate themselves as education reformers. In the case of DINTA, however, the arguments were not for reform in school, but rather for training programmes in industry.

Across all levels of education engineers argued for an increase in technical education and against any change that would limit the ability of students, institutions, and industry to create, use, and control technology. They wanted to see an education system which embraced the positive aspects of technology and "forcefully clarified" any negative images of technology for students. Often, the engineers argued for reform in terms of technology's cultural value, repeatedly pointing out the essential nature of technology to both modern and ancient culture.

In addition to addressing cultural, social, and educational reforms, engineers also sought to engage with modernity and technology on a philosophical level. The engineers attempted to create a variety of philosophies regarding technology. These philosophies were related to many different things including natural sciences, philosophy's role in education, and philosophy as a definition of technology.. Regardless of the terms used to by the engineers, they always sought to incorporate technology as a positive force in their philosophies..

Carl Weihe philosophized about technology in terms of its relationship to the natural sciences. For Weihe, technology and the natural science existed in a complicated

relationship. Part of the relationship was technology's dependence on modern science: "Modern electrical technology, the technologies of heat and water power, the great chemical technology, the iron, steel, and material technologies are unthinkable without the examination and research of the natural sciences."[246] However, Weihe cautioned that it was too easy to fall into the trap of saying that scientific knowledge was the basis for technical examination and that the engineer played no role in science. Weihe argued, with regards to the engineer's role in scientific research, that "the basic concepts of electricity, heat, and mechanics, also need the engineer. He calculates the mass, acceleration, centrifugal force, temperature, entropy, absolute temperature, tension, resistance, current intensity etc. and uses the lever concept, the principle of virtual velocity, the Marriote-Boyle Law, Ohm's law, and Kirchoff's law, and many others which Physics has taught to us."[247] Consequently, Weihe believes that research in both science and technology are related through the engineer who is instrumental to both, not just because of technology's dependence on science. Indeed for Weihe, technology and the natural sciences go "hand in hand." In keeping with his philosophy regarding technology and natural science, Weihe demanded that the connections between the two be stressed as part of education. "We demand that the teachers of the natural sciences" he argued, "concern themselves more with technology, with the living, practical technology."[248] Wiehe developed his philosophy of technology in terms of the relationship between science, technology, and the engineer, and their dependence on each other.

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[246] Weihe, (May 1927): 83.
[247] Ibid..
[248] Ibid..

Engineers also philosophized about technology in terms of the natural world. In Die Natürliche Technik, published in the May 1930 issue, Kurt W. Geisler, a Diploma Engineer from Aachen, compares the processes of technology to the processes which occur in the natural world:

> When man speaks of technology, he speaks of a method, procedure or process, by which it is possible to reach a destination of the most perfect nature. Normally, man only thinks of human destinations and accordingly only of human technology. Also the pages of this journal almost never address other things than human technology.
>
> A glance at our environment teaches us that also here "destinations" with "technical" aid can be reached. It is even difficult to draw a border between these differences and it can only be fixed once an understanding of technology has been agreed upon... Such "beautiful forms" [technology] we find in every organism, in the body of man himself, who is the highest form of animal, the lowest animals, or plants. Technology, in the framework of this essay, should not be thought of to mean an artistic process, but rather only a process, that any human machine or building technology is related or similar to. It should also not be treated as the technology of feeding, propagating, moving, etc, but rather these technologies are only mentioned here if the nature of the foundation or process is the same or similar as man uses in his machine or building technology."[249]

Geisler defines "technology" in terms of human machine or building processes in order that he may apply this definition to the natural world and explore the way in which technology is evident in nature. This definition emphasizes the positive image of technology that engineers attempted to incorporate into their philosophies. Technology, which is created by humans, is a process which leads to a "perfect nature." However, Geisler notes that it is not only humans that can create such perfection, but also nature. Geisler also reverses his comparison of human technology and nature to query as to whether the human worker can be compared to the single cell in terms of leadership, wondering if nature influences or should influence technology and industry. He cites thinkers such as von Uexküll, who argued that there was a connection between plant and

[249] Kurt W. Geisler, "Die Natürliche Technik," *Technik und Kultur* (May 1930): 73.

animal organization and human commerce and entrepreneurialism, hoping that they could at least provide the beginnings of an answer. Geisler's philosophy links technology and the natural world together through demonstrating how technology, by Geisler's definition, is evident in nature and by hypothesizing that perhaps nature itself has an effect on the technical worker and technical industry.[250]

In addition to philosophizing about technology in terms of science or nature, Engineers also attempted to create philosophies which would function as definitions of technology. P.K. Engelmeyer, for example, felt that, "It is too early to write down a philosophy of technology. A precursor shall have to do for the time being."[251] Central to Engelmeyer's precursor are a history of technology based on what he refers to as stages of abstraction and thirteen key principles of technology. Additionally, Engelmeyer discusses several books that deal with the philosophy of technology, such as Max Kraft's, Das System der technischen Arbeit from 1902 and Max Schneider's, Über Technik, technisches Denken, und technische Wirkung. Engelmeyer defined the thirteen key principles of technology. These principles span a variety of topics including: the machine, the inventor, the economy, and precision. Under each heading, Engelmeyer discussed the way in which technology was related to the heading in question. For example, under the heading, "the machine principle," Engelmeyer states that there is much more to technology than merely the machine principle. Engelmeyer indicates that creation is also central to technology and that "without creation there is no technology".[252] Additionally, there are four main schools of thought with regards to the machine principle: the technological, the kinematic, the constructive, and the economic.

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[250] Ibid.
[251] Engelmeyer. (May 1927).
[252] Ibid., p. 89.

Each of these schools of thought defines technology in a different way. The technological looks only for the solutions to problems, the kinematic school sees technology as a mechanism, the constructive thinkers only look to the components of the mechanism, while the economic school only takes the economic effects of the machine into consideration.[253] Under the heading The Economic Principle Engelmeyer indicates the economy and technology are tied together and without technology there would be no economy.[254] Engelmeyer feels that the economy drives the creative genius of the engineer in all practical ways, and that the economy is merely the expressive form of technology. Technology gives the necessary conditions for the economy and the economy provides the social conditions for the creation of technology.[255]

Heinrich Hardensett, a Diploma Engineer from Konstanz, also discusses a philosophy of technology in January 1933's article, "Die Techniketheorie des Technischen Mensch." With grandiose expectation Hardensett states, "There is until today no general technical theory of technology or any technological teachers, there is even no fully realized technical type of man."[256] From here Hardensett explains how there are various special theories that relate to technology, such as a capitalist theory of technology. However, for Hardensett these theories are representations based on the analysis of a certain type of man. In the instance of a capitalist theory of technology the theory is the representation of the capitalist man.[257] Hardensett also believes that there are only technologically helpful sciences and technologically special sciences that,

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[253] Ibid.
[254] Ibid., p. 90.
[255] Ibid.
[256] Heinrich Hardensett, "Die Techniktheorie des Technischen Mensch," *Technik und Kultur* (January 1933): 3.
[257] Ibid.

though they deal with technology, place it in a secondary role, and have contributed to the erroneous definitions of technology.[258] For example, technologically helpful sciences deal only with science, they do not take into consideration the necessary connections between the working man and the social reality of his work.[259] Technologically special sciences such as mathematics and mechanics are not technical theories because they have not evolved from the analysis of the technical man.[260] What Hardensett desires is a theory of technology from the perspective of the technological man, not the capitalist man or the man of science. He wants to see a theory that's primary purpose is to deal with technology, as well as to examine the social, economic and cultural impacts of technology.[261] This general theory must not replace special technical theories and supporting theories, but instead give reasons for the important connections between them.[262] Hardensett argues that it is the task of the engineer to create the new technical theory of the technical man, because he believes that "A technical theory is only technical if creative work is situated at the center of its theoretical framework..."[263] Hardensett argues that in order for there to be a true technological theory, it needs to originate not in the halls of academia, or in the mind of the economist, but in industry factories and in the minds of the engineer.

Engineers also related technological philosophy and theory to education. Goldbeck's article on education demonstrates that the engineers thought that a philosophy of technology was essential to the education of engineers. For Goldbeck, a

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[258] Ibid.
[259] Ibid.
[260] Ibid., p. 4.
[261] Ibid., p. 3.
[262] Ibid., p. 4.
[263] Ibid., p. 6.

theory of technology was an essential building block in creating education reforms that were necessary for a modern, technical education.

The manner in which engineers approached the question of a philosophy of technology was very diverse. Some engineers, such as Carl Wiehe and Kurt Geisler discussed a technological philosophy in terms of the natural sciences and the natural world, while others, such as Engelmeyer attempted to define technology using thirteen key principles. Finally, Hardensett argued that a philosophy of technology could only be created by those who worked with and created technology everyday, the engineers. Regardless of the type of discourse, German engineers felt strongly about questions concerning the philosophy of technology and readily explored the issue.

German engineers also discussed economics and the German economy. Topics in this area were diverse. They ranged from questions of Germany's role in the international economy to the economic validity of ideas such as Fordism and rationalization. Additionally, they varied from pure economic discussion to semi philosophical discussions about the relationship between technology and the economy. With regards to the world economy and Germany articles such as Dr. Walter Flemmig's, "Die Krise in der Internationalen Automobilwirtschaft"[264] and "Deutsche Schwerindustrie und Weltwirtschaftskrise."[265] discussed key global issues such as the automobile market and analyzed how they related to Germany and what economic effects the German economy could expect. German engineers also took the time to review books, which discussed the economic situation in Germany, in *Technik und Kultur*. An example of this is

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[264] Walther Flemmig, "Die Krise in der Internationalen Automobilwirtschaft," *Technik und Kultur* (October 1930): 160-164.

[265] Walther Flemmig, "Deutsche Schwerindustrie und Weltwirtschaftkrise," *Technik und Kultur* (April 1931): 64-66.

Steinmetz's review of Fritz Reuter's Die Exportmöglichkeiten der Deutschen Maschinenindustrie, which examined the possibility of economic advance through an analysis of the potential to export German machine products, in the November 1924 issue.[266] Another example is Stern's critique of Ford's book. With regards to Ford's economic strategy of high wages and cheap goods, Stern argues that, "In this system it appears particularly hard, to find a basis for the new relationship of price to product."[267] Consequently, he has reservations about a Fordist system functioning successfully in a German context.

Related to Stern's concerns about Fordism, are K. Elbel's concerns about rationalization and the German economy. Elbel argued that the individuals and their training were instrumental to the success of the German economy and stressed that rationalization should be avoided as it would lead to the rationalization not only of mechanical and machine processes, but also to the worker. He even goes so far as to quote the Director of the Kaiser Wilhelm Institute, stating "rationalization of the man invariably equals rationalization of the machine."[268]

German engineers also examined the connections between technology and the economy. One of Engelmeyer's thirteen key principles dealt exclusively with the economy. For Engelmeyer the economic principle, "drives all the actions and dreams of the engineer in practice. Economics is only forgotten in the school or in the laboratory."[269] He believes that technology created the necessary conditions in which the

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[266] Steinmetz, K.F, "Die Exportmöglichkeiten der Deutschen Maschinenindustie," *Technik und Kultur* (November 1924): 121-122.
[267] Stern, p. 112.
[268] K. Elbel, "Der Einfluss der Wirtschaftlichen Entwicklung auf die Personal-Schulung und das Vorwärtskommen in der Industrie," *Technik und Kultur* (May 1930): 81-82.
[269] Engelmeyer, p. 90.

economy could exist, while the economy provided the necessary social conditions to allow technology.[270]

Just as they devoted the time to discuss philosophy, culture and, education, engineers also found time to engage with questions concerning both the economic and political situation in Germany. And just like the topics covered in the philosophical, cultural, and educational discussions, the topics involving economics and politics were diverse, covering issues ranging from exports to rationalization.

German engineers also found space in the pages of *Technik und Kultur* to discuss issues regarding politics. In the November 1918 issue, Friedrich Heintzenberg, a Diploma Engineer from Berlin, argued that engineers needed to be politically responsible. Heintzenberg believed that the engineers had considerable influence and that it is their duty to wield this power in the service of Germany.[271] Heintzenberg writes:

> ...at this time the engineer has the opportunity, in direct connection with his occupation to collaborate in political responsibility. It must be remembered that the engineer, appointed as a mediator between the working class and the employers, can have an effect on the solution to the important questions of inner politics or on the influence of German engineers in foreign lands on German world politics.[272]

Heintzenberg believed that the engineer's influence was considerable enough that it could affect politics on a world scale. Additionally, he believed that the engineer had been appointed as a mediator between the working class and the employers. Thus, Heintzenberg argued that engineers had a duty to influence politics at several different levels. On one level, this influence should be to combine political thinking and

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[270] Ibid.
[271] Friedrich Heintzenberg, "Deutsche Politik und deutsche Diplom-Ingenieure," *Technik und Kultur* (November 1918): 121
[272] Ibid.

technological thought with the general political ideas of former German Chancellor Prince Bülow.[273] On another level it should be used to address social and economic issues between the differing classes of society. Given Heintzenberg's admiration for Bülow and his policies of eastern expansion, naval expansion and the economy in the service of the nation, he seems to be politically aligned to the right.[274]

This lends credence to Gees Kispen's claims that German engineers embraced right-wing politics as a result of the desire to avoid the social leveling of the left. However, Kispen also notes in "National Socialism and the Technological Culture of the Weimar Republic," that the goals of both engineers aligned to the left and the right were focused on inventor rights:

> From the "inventor left," big business was attacked by middle class trade unions of technical workers, engineers and industrial scientists demanding statutory royalties for their inventions and moral recognition in the form of a patent statute based on the first to invent principle. From the "inventor right", the legal corporate establishments were assailed by independent inventors demanding lower patent fees and protection from large firms that either stole their intellectual property or ignored then outright.[275]

The focus of both left-wing and right-wing engineers inevitably led the engineers to choose National Socialism as their political alignment, because, as Gispen, notes the Nazis actively sought to encourage and promote inventor rights since they believed that such actions would lead to increased industrial output, better innovation and more productivity. Such improvements would consequently tip the balance of power in Europe in Germany's favor.[276] Consequently, despite initial political alignments, Gispen argues

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[273] Ibid., p. 121.
[274] Ibid., p. 120.
[275] Kees Gispen, "National Socialism and the Technological Culture of the Wiemar Republic," *Central European History* (December 1992): 387-407.
[276] Kees Gispen, "Visions of Utopia: Social Emancipation, Technological Progress, and Anti-Capitalism in Nazi Inventor Policy, 1933-1945," *Central European History* (March 1, 1999).

that by 1933, most engineers were firmly in the Nazi camp as a result of Nazi inventor policy.

Milous' criticism of Gemäldes painting is also an indicator of the engineer's desire to enter into the arena of political discussion. The section of the magazine which the article appeared in was titled "Kultur-Bolschewismus."[277] Consequently, it is evident that engineers such as Milous wanted to connect negative connotations and depictions of technology to left-wing political ideas.

German engineers wanted to situate themselves as more than inventors of technology, they thought of themselves as artists creating culture that contained both beauty of function and beauty of appearance. They made constant mention of the engineer's responsibility in creating technology that was culturally beneficial in order further both technology and culture. Additionally, as creators of culture, engineers felt that they had a responsibility to characterize both technology and the relationship between technology and culture as beneficial. In light of this, engineers took great pains to situate themselves as cultural critics. They criticized artists who depicted technology as negative, as well as addressing the pessimism felt with regards to technology and culture. Thus, in relation to Herf it becomes clear that the main goal of the engineers with regards to culture and human creative genius was to counter negative perceptions of technology. Additionally, German engineers defined the modern world in terms of technology and actively sought to enter into any debate which they felt had a technological aspect. Thus, they attempted not only to situate themselves as cultural critics and cultural creators, but also as social and education reformers, philosophers, and political and economic thinkers. In their debates engineers aggressively lobbied for a positive characterization of

[277] Milous, p. 167.

technology, both lauding its benefits and playing down it's negative effects in all aspects of the modern world. They constantly argued for an increase in technological or technologically related curriculum in both the gymnasium and post secondary schools. As well, they repeatedly demanded that the important role of technology be clarified by educators. Conversely, they vehemently opposed any curriculum change that would impact invention and technology in a negative way. They worked to minimize accidents and analyzed accident statistics involving technology in order to control the negative aspects of technology. Additionally, the argued repeatedly with regards to accident prevention, that prevention was the responsibility of the man, not the machine. They criticized media such as artwork and film if it depicted technology in a negative manner. German engineers did not spend the majority of their time engaging in "cultural politics," as Herf asserts, but rather in situating themselves as critics of modernity, of which cultural politics played a part. They criticized all aspects of German modernity from the education system to social reforms and they did so from the perspective of the professional technical man, a man whose occupation provided him with a unique insight and knowledge of technology and how it impacted society.

VI. Epilogue

The intellectuals of the late Wilhelmine and Weimar eras were faced with the task of understanding a world that was bearing witness to rapid changes in all areas of life. German historians have long examined the writings of these thinkers in normative terms; they have counter-posed the actual contents of philosophy and cultural criticism to their own definitions of the modern. Such is the case with Jeffrey Herf's argument concerning "reactionary modernism" and the men he groups under this term. Herf argues that the reactionary modernist fusion of a desire for technological advance with the irrationalist idea of the "triumph of spirit and will over reason" represents a burdensome ideological contradiction. This argument requires that Herf accept some type of normative definition of modernity.[278] As Allen suggests, for Herf's assertion to be correct, for a burdensome ideological contradiction to exist, then Herf's definition must equate "the Enlightenment for modernity in general and mistake technological rationality as the pinnacle of all human reason derived from the Enlightenment."[279]

However, the intellectuals of early twentieth century Germany, men like Spengler, Jünger, and Heidegger, were not reacting against or judging modernity, and as such they cannot be judged using normative definitions. Instead these men and their engineering contemporaries must be examined with the understanding that they themselves were defining modernity from a variety of standpoints and in a myriad of different ways. However, for these thinkers there was one common component in all the definitions. That component was technology. Technology was at the center of the

[278] Herf, pp. 12-13.
[279] Allen, pp. 14-15.

definition of modernity for all of the thinkers that are discussed here. Whether they defined the modern world as the culmination of the decline of western and German culture, (Spengler and Heidegger), or as soldier-worker's utopia (Jünger), technology was always the driving force which led to the change from the pre-modern to the modern.

Additionally, it is important to understand that the definitions of these German intellectuals with regards to modernity were all influenced markedly by the standpoint from which each thinker chose to approach the issue of the modern world. The most telling example of this is Jünger's use of the "Dandy" literary archetype in his description of the *Fronterlebnis* and the men who were shaped by it. Just as Jünger approached the topic of modernity from the standpoint of an author, his contemporaries had their own influences. Spengler viewed himself as a historian and as a consequence he defines modernity in historical terms as the progress (or perhaps regression) from *Kultur* to *Zivilization*. German Engineers believed that the modern world was a world of the machine, a world in which every aspect of society was directly, and more importantly, beneficially affected by technology. As educated "masters" of technology, engineers believed that they were the gatekeepers of the modern world, trained professionals who were responsible for ensuring technology would never be misconstrued by a society unaware of its true impact and importance.

The assertion that German intellectuals of the late Wilhelmine and Weimar periods were defining modernity in their own ways adds an interesting facet to the debates surrounding the rise of National Socialism, since it is often the abnormal German reaction to modernity which is cited as the definitive reason for the Nazi's rise to power. This study does not focus on Nazi definitions of technology and the modern. It cannot,

therefore, contribute directly to these debates. Nevertheless, its re-reading of Spengler, Jünger, Heidegger, and the engineers does challenge the central arguments of proponents of a German cultural-political *Sonderweg*. It does so by demonstrating that the definitions of modernity embraced by early 20th century German intellectuals, while all centering on technology, represented the eclectic influences of these men and their varied approaches to the topic of modernity. Thus, this study demonstrates that any re-reading of early 20th century German intellectuals needs to consider that these thinkers were developing multiple, simultaneous reactions to, and definitions of, modernity, and as such cannot be judged to have reacted abnormally or uniquely to modernity in terms of a single normative definition. Consequently, the origins of National Socialism need to be considered in terms of the development of a heterogeneous system of ideologies, rather than the linear development of a single ideology, such as "reactionary modernism."

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